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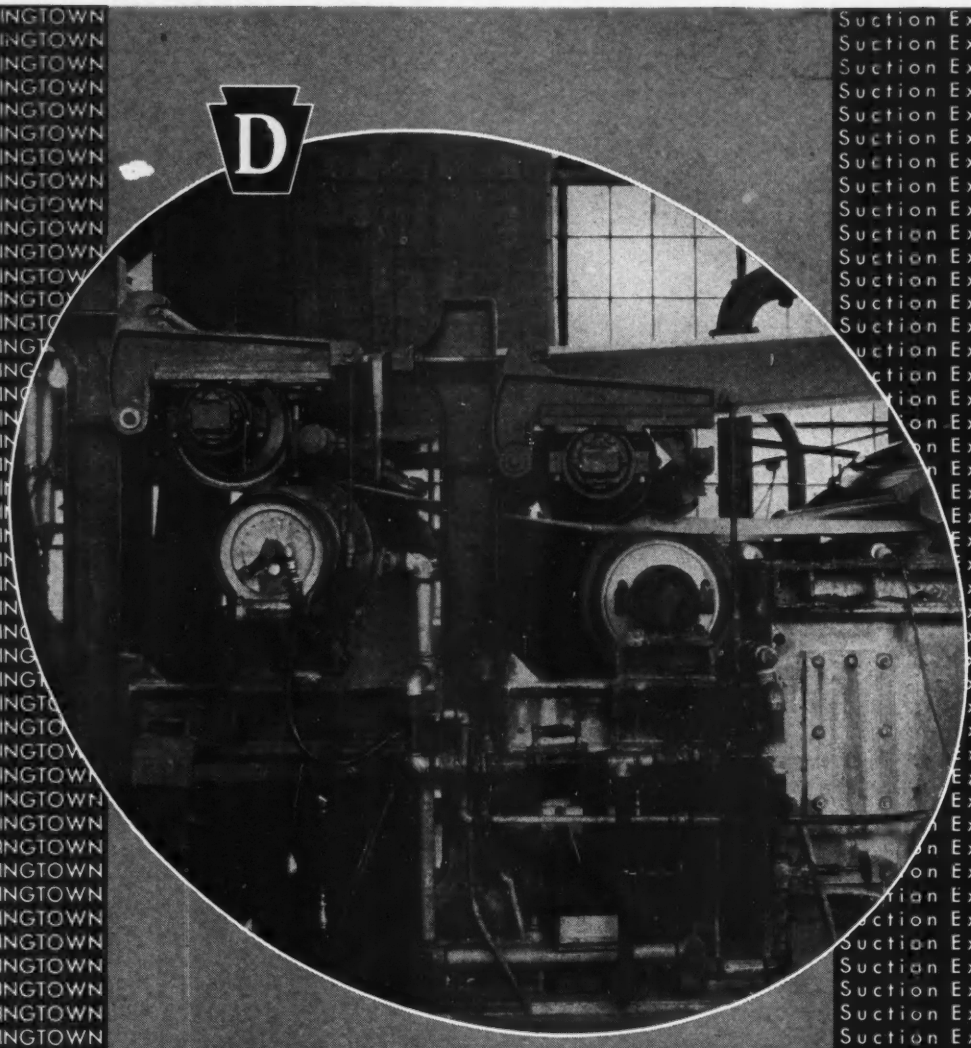

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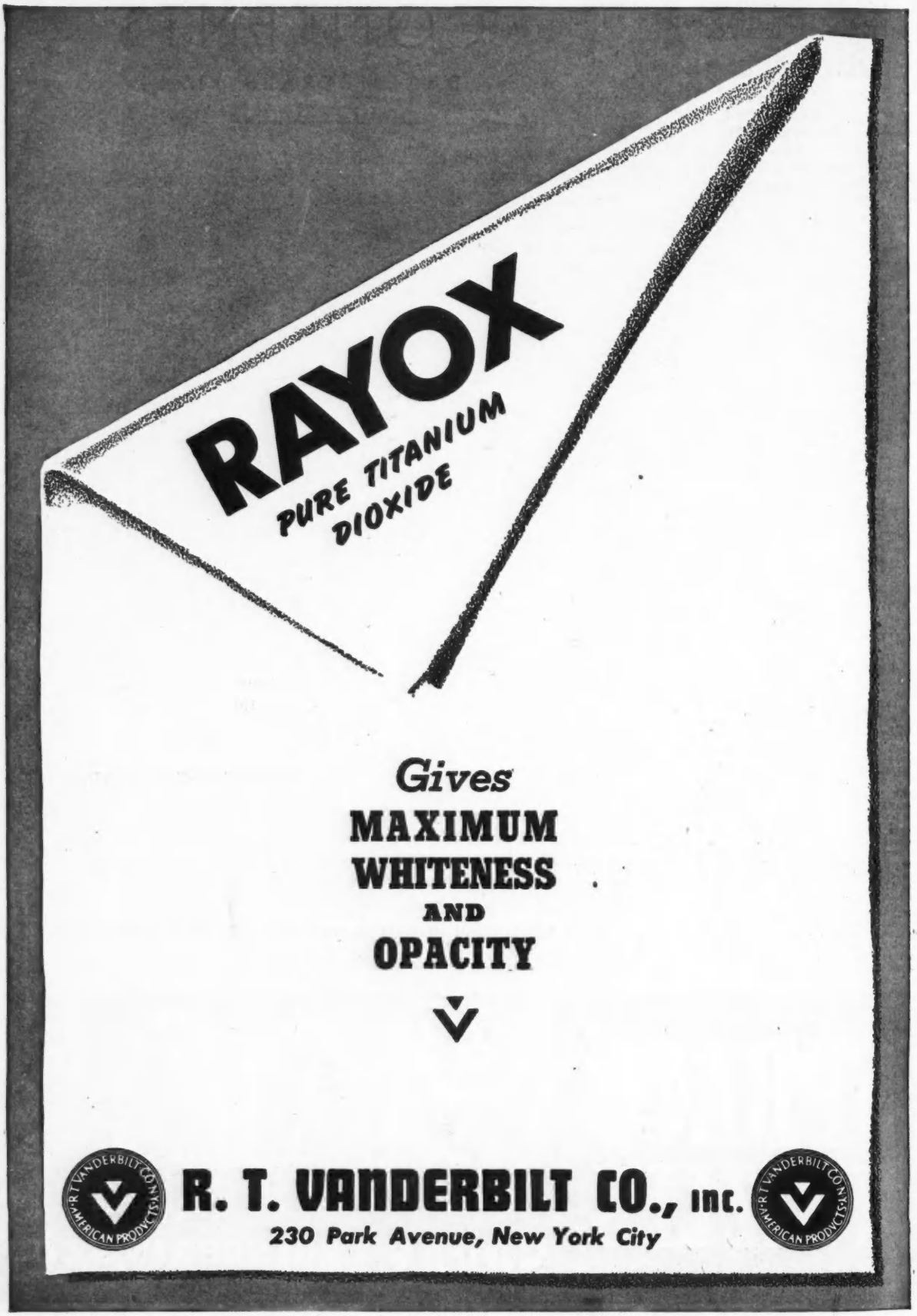
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PAPER TRADE JOURNAL

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December 28, 1944

Urges Pacts For Orderly Post-War Trade

Paul Kellogg of Newsprint Association of Canada Advocates Agreements To Prevent Cut-Throat Competition After War—Foresees Exhaustion of Forests In Half Century — Other Late Mill News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 26, 1944—International agreements to prevent ruinous post-war competition in the pulp and paper industry were advocated by Paul Kellogg, general manager of the Newsprint Association of Canada, in a public address here during the past week. Counselling active preparation now for after-war conditions, he expressed the view that in order to maintain the true position of the pulp and paper industry of Canada in world markets, the Dominion Government should attempt to make some agreements with other pulp and paper manufacturing and exporting countries to prevent ruinous and uneconomic competition. The importance of this to the country he emphasized by pointed out that the pulp and paper industry during the last generation had been the mainstay of Canada in its world trade and the primary source of foreign exchange. Further, that it gave every prospect of occupying that position again in the post-war period, as it had no conversion problem to face and had cash markets for its products. To illustrate its position in the export trade, he cited the following as the chief exports of Canada just prior to the war: monetary gold amounted to about $184,000,000; pulp and paper, about $150,000,000; and wheat, about $109,000,000. The only other export valued at more than $50,000,000, he said, was nickel, which was exported to a value of $58,000,000.

Supporting his argument for international agreements, he said the pulp and paper industry depended for its very existence as a major industry on the tariff and other policies of the government, over which, of course, it had no control, adding: "It has to compete in world markets with similar products shipped to market at rates made ridiculously low by subsidy, and manufactured in countries with low labor costs. Against this competition Canada has been able to hold what business it has (and usually at considerably higher prices than our foreign competition) because of our quality, uniformity of product, general ease of doing business between the United States or Empire coutries and Canada, but most important of all, because of our reliability as a source of supply, evidenced by the large capacity of our industry."

Mr. Kellogg also called for an early end of the Wartime Prices and Trade Board regulations in respect to the industry, observing: "Working through the Wartime Prices and Trade Board, the newsprint section of the industry has pooled its production and shipments in order to give the best service to its customers and so that the last stick of pulpwood can be converted into newsprint for the benefit of the industry as a whole. These uneconomic and unnatural arrangements will some day, perhaps soon, be no longer necessary. They have cost money, but in spite of this during the five years of this year selling prices of newsprint have increased only 14% as against a 90% increase in the similar five years in the first World War."

Concluding, Mr. Kellogg mentioned four reasons why Canadians should be pleased that the pulp and paper industry should be Canada's greatest industry, namely: The products of the industry are highly essential and widely diversified; there is a high probability of its permanence; it is still a young and developing industry; and in its operations it reaches a large number of other Canadian industries and employs many workers in widely scattered communities.

Foresees Exhaustion of Forests

Stating that at the present rate of exploitation the forests of Quebec Province will be exhausted in 50 years, Hon. J. S. Bourque, Minister of Lands and Forests, told lumbermen at a meeting here that the Quebec Government is very much alive to the problems of the forest areas and has already launched plans for solving them. Specifying various conservation measures, he said the Government's experts were co-operating with U. S. experts sent from Washington to study forest pests and tree diseases. The Government had already started rigorous conservation and reforestation measures, and had stationed forest engineers in several sections with special missions, among which were the marking of trees which should be felled and others which needed special preservative treatment, and lecturing in schools.

To Erect Paper Mill Building

Work has been started at Ville Lasalle, in the suburbs of Montreal, on the construction of a paper mill for the manufacture of roofing felt and sheathing papers used in the building trades. This is a project of Building Products Limited, of Montreal. The cost of the buildings will be $120,000 and of the entire project $365,000.

Price Bros.' Expansion

Price Brothers and Co. have awarded contracts for additions to their paper mill at Kenogami which will be utilized to improve the quality of the sulphite pulp which they manufacture and to provide larger packing and shipping facilities.

Utilizes Waste Paper For Temporary Houses

Institute of Paper Chemistry Develops Chip Board House Which Stands Weather Tests — Offers Plan For Reforestation — Union Sends Greetings To Badger Tissue Mills Co. — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 26, 1944—To meet a need for temporary housing for persons left homeless in the war areas, the Institute of Paper Chemistry in this city has developed a house from waste paper. An experimental structure has been standing on the grounds of the Institute for several months. It has stood the tests of weather, having stood a 60-mile gale which wrecked a number of wooden farm buildings in the Fox River Valley last August. A load of more than 6,000 pounds has been placed on the roof, proof that it would not break down under the weight of snow.

Waste paper is pressed into panels which can be assembled into a house in about an hour, at a cost of less than $110. The structure will house four persons, and will withstand weather for at least one year. Material can be packaged in a bundle weighing 1,029 pounds.

The Institute staff undertook the problem two years ago, when the War Production Board's division of production and research announced the need of temporary housing for homeless in war-ravaged areas. A low-cost structure able to resist tropical heat or arctic snow, rain and wind was specified. The Institute waived its peacetime policies against grants, in order to undertake the problem. Only 31% of the total has been used in the development of the house.

The paper panels are treated to be weather and fire resistant. Between strips of chipboard about an inch apart there is a curved strip for bracing and insulation. The panels are numbered for sequence in assembly and have cellulose windows and even a paper shade. The only metal is in the flanges. The chip board material weighs around 980 pounds. More permanent flooring such as wallboard adds about 130 pounds.

The British government has shown interest, indicating need for at least 250,000 temporary structures, and relief agencies caring for refugees told of need for at least 500,000. However, no action has been taken toward production of the paper house or one of similar construction, since chip board is scarce and paper making machinery is already in full operation.

Westbrook Steele, Institute director, said that easy transportation, in a package that could be dropped by parachute, and quick construction were among the primary objectives. He said staff members believed the house would last longer than four seasons, although the time has not been determined.

To Use Sulphite Liquor Waste on Streets

The common council of the city of Marinette, Wis., has again authorized the city's board of public works to enter into an agreement with the Marinette Paper Company for the purchase of sulphite liquor to allay dust on the city's streets.

Clarence Uecke, chairman of the board of public works, quoted a letter from the paper company, showing a per-mile cost of $16.32 for the sulphite treatment, as compared with $60.73 for chlorite. It was stated that the acid in the sulphite liquor does not harm the black top because the acid dissolves and only the pitch stays on the road.

Offers Plan for Reforestation

Vergil L. Dickensen, Augusta, Wis., a member of the Wisconsin Conservation Commission, has offered a plan for reforestation and postwar employment in Wisconsin, whereby a specific legislative charter would be granted to a quasi-public forestry corporation in wh ch 17 counties would participate. Located in the central, northeastern and northwestern sections, these counties have great areas of inferior lands.

Mr. Dickensen would capitalize the proposed corporation through loans from one of several federal agricultural lending agencies on a long-time basis. He suggests 50 years. The corporation would reforest thousands of acres not suited for agricultural production, but capable of paying dividends in forest products.

He insists that, even limited to pulpwood, those lands can be made to return a steady, annual profit, despite the fact that many of them are now valueless.

The corporation would buy or lease land, and harvest the pulpwood and timber at maturity, with all returns being applied to repayment of the loan principal and interest. Capitalization would be sufficient to pay localities a land tax on the land acquired. Private lands could be reforested on a custom basis. All work would be in intimate collaboration with specialists of the conservation commission and the University of Wisconsin.

Mr. Dickensen argues there is a fundamental need to broaden the tax base in order to develop Wisconsin's resource, to perpetuate existing industries and encourage new ones with local raw materials, and to protect the welfare of many communities in the forest regions.

Union Extends Greetings to Badger Mills

Local 298 of the International Brotherhood of Paper and Sulphite Workers on Wednesday, December 20, published an advertisement in a daily paper extending the season's greetings to the management of the Badger Tissue Mills, Kaukauna, Wis., and expressing appreciation for the many benefits received during 1944. These included:

Hospital and surgical benefits for employes and their dependents and a weekly benefit of $15 for sickness and off-duty accidents for employes; a $2,000 life insurance policy, the company paying three-quarters of the total cost; a yearly bonus of $100 for employes who worked 2,000 hours during the year, and a proportionate amount for those who worked less; $100 bonus payments to employes in the armed service, those who worked less than a year receiving a proportionate amount, 12 persons being included, each also having received two weeks' pay on entering service; turkeys for Thanksgiving; an annual outing, and fine working conditions.

The advertisement also stated that the company is about to install a profit-sharing trust.

Chicago Expects Increasing Paper Shortage

Enormous Government Demands Seen As Sharply Curtailing Paper and Paper Board For Civilian Use—WPB Explains Its Program—Paper Group Meets — Waste Paper Supply Is Low — Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 26, 1944—The "most tragic Christmas on record" bids fair to bow out a 1944 which has seen the paper industry at its most important spot in our national economy, not yet appreciated by the citizenry at large for that importance, and faced with the most critical shortages in its history. This is the consensus of opinion of Chicago leaders who believe that the industry must leave no stone unturned to capitalize on its enviable record and who are certain that paper will be an even more scarce article this time next year.

Setbacks in Europe have only served to quell the final hope of some die-hards that Swedish pulp would alleviate the situation in this country. The same military set-back means a longer war, more extensive use of paper for field operations, for transmitting supplies to the military and for over-all military usage in this country and abroad. No markets, locally, were freed of the specter of worse times during 1945. Sulphites, krafts and other lines were long ago critical and now their good "substitutes" have moved into that list as government plans to make unprecedented demands on the trade.

Waste paper conditions were not reported as too favorable and the industry here "sat tight" on its program of doing the very best it can with what it has—and that "what it has" is growing smaller every day, according to reports.

Paper Group Meets

The Chicago Professional Papers Group held its final meeting of 1944 on Monday evening, December 18, in the dining rooms of the Chicago Bar Association. Seventy-five members and guests were treated to two separate phases of entertainment under the chairmanship of Harry Weston, newly elected head of the Group. The first was an interesting demonstration of the intricate dial telephone system presented by specially trained members of the Illinois Bell Telephone Company staff and the second was a color sound moving picture presented through the courtesy of the Hercules Powder Company, "Careers for Cellulose," which told an intensively interesting story of the vast research program of the company which had developed new post-war "careers" for cellulose. It also pointed out the effective ways in which the product had "gone to war." Monthly meetings will continue in January and throughout the balance of 1945 with the exception of a brief recess during the mid-summer months.

Waste Paper Supply Low

The waste paper supply in the Chicago area continued to be "perilously low" as the winter weather brought its usual retarding of paper collections. All grades of waste paper are reported badly needed by mills in this part of the country and salvage officials are making special efforts to speed up collections. Outlook for supplying mill needs in the near future were not bright, according to local waste paper trade executives, who indicated that supplies of waste paper were dwindling and that there was a sharp decline in pulpwood. The trade also anticipates a large increase in the demand for paper bags shortly after the first of the year although activity is relatively stable at this time. Waste rag trade sources pictured a tight situation for all grades of rags with the manpower shortage giving local outlets a great deal of grief in all branches of the waste paper and allied industries.

WPB Explains Paper Program

The Illinois Federation of Retail Associations this week received a letter from J. Hale Steinman, director of the printing and publishing division of WPB, in answer to a request that the ban be lifted on newsprint and advertising papers as soon as possible. The request voiced the belief that sound advertising must be "ready to go" at the earliest possible moment if goods are to be sold in enough quantity to insure the "highest level of employment."

The reply from Mr. Steinman read in part as follows: "I very much appreciate your recognition of the difficulties inherent in the equitable administration of the printing paper orders. I believe I can guarantee to you that the artificial restrictions imposed by these orders will be removed at the earliest possible moment. Furthermore, I can assure you that any increase in the supply of newsprint and other printing papers will be reflected in the relaxation of our limitation orders whenever such relaxation becomes possible. It will continue to be our purpose to promote the manufacture of paper in ever increasing quantities and to relax quotas under our orders in such a manner as to permit full consumption of all of the paper that can be manufactured in the freest possible manner. In short, our problem is one of the equitable distribution of paper and not of limiting the use of paper for the sake of the restrictions themselves."

Salesmen Hear Association Chaplain

About forty salesmen and their guests were present at the weekly Salesmen's Association of the Paper Industry on Monday noon, October 18, when Bishop W. E. Conkling, chaplain of the Association, delivered his annual Christmas message. It was perhaps the most impresive of all the grand messages the salesmen have received at this holiday period; a warm, intensive effort to soft pedal the commercial, celebrating, tawdry elements of Christmas and to place the true meaning of Christmas in a predominating position. Bishop Conkling stressed the fact that this year, more than ever before, would the deeply religious aspects of the holidays appeal to thousands of American families with members on the line of battle and he urged those in attendance to do their level best to place the proper meaning and the proper values on their own Christmas observance.

Burt Fisher made a special trip from Neenah, Wisconsin, to hear Bishop Conkling and to introduce him to the group.

Obituary

Robert Caldwell

Robert Caldwell, vice-president of the J. & J. Rogers Company, died of a heart ailment at his home in Au Sable Forks early Sunday morning, December 17.

Born in Glasgow, Scotland, August 15, 1887, the son of the late James Caldwell and Christina (Wright) Caldwell, he came to Cornwall, Ontario, with his parents at the age of five. In 1904 he accompanied his family to Au Sable Forks where he obtained employment in the office of the J. & J. Rogers Company. He rapidly rose to the position of assistant superintendent of the paper mill and in 1931 was made superintendent and elected member of the board of directors. In 1934 he became vice-president, and continued active in business until a few weeks ago.

Mr. Caldwell had many friends throughout the paper industry, where he was well known. He was a member of the Technical Association of the Pulp and Paper Industry, and of the American Pulp and Paper Mill Superintendents Association, serving on special committees.

A charter member of the Au Sable Forks Rotary Club, Mr. Caldwell was elected vice-president in 1940 and since then had been a member of the board of directors. He was also a member of Tahawus Lodge, No. 790, F. & A. M., and of Plattsburg Commandery, No. 49, Knights Templar. In 1919 he was elected school director, and held that office until his death.

Mr. Caldwell was very active in the First Methodist church of Au Sable Forks, having been Sunday school superintendent for twenty-eight years, a member of the choir, and since 1915 a trustee.

On November 17, 1913, he married, at Amarillo, Texas, Jessica Coville Corbin of Oxford, N. Y., who died June 21, 1939. On November 24, 1943, he married Marjorie Genske Fey, who died January 2, 1944.

H. L. Hammarlund

Henning L. Hammarlund, chemical engineer, with the Hamersley Manufacturing Company, Garfield, N. J., died at the Passaic General Hospital on December 15, following a week's illness, at the age of 46.

Mr. Hammarlund was born near Linköping, Sweden. He was awarded his Chemical Engineering Degree from Chalmers Technical Institute of Göteborg, Sweden. After graduation he was connected, for a time, with Holmens Bruk Pulp and Paper Mills in Sweden, and later with a paper mill in Halle, Germany.

In 1923 he came to the United States, his first employment being with the firm of Emil F. Johnson. Ever since the latter part of that same year he was connected with The Hamersley Manufacturing Company.

Mr. Hammarlund was in charge of the production and use of pulps and other materials in the paper mill, as well as of the Department of Inspection and Tests which controls the quality of finished product.

He is survived by his widow, Mrs. Ingrid E. M. Hammarlund; and in Sweden, by his father, a brother and a sister.

Howard L. Seaman

Howard L. Seaman, president of the Lobdell Company of Wilmington, Del., died at his home in that city on November 27. Mr. Seaman was associated with the Lobdell Company for 35 years. Identified with banking and industrial interests he was also active in Boy Scout and religious circles, and president of the Delaware State Board of Education.

Mr. Harold L. Springer, Jr. has recently been elected president of the firm to succeed Mr. Seaman. Mr. Springer was formerly secretary and treasurer of the Lobdel Company.

Charles N. Bicknell

CLEVELAND, Ohio, December 26, 1944—Charles N. Bicknell, age 73, vice president of the Union Paper and Twine Company and husband of Mrs. Lula J. Bicknell, was stricken with a heart attack and died Monday, December 25 at Palm Beach, Fla., where funeral services took place Wednesday, December 27 at 2:00 P.M. Until 1936 Mr. Bicknell was treasurer and general manager of the Union Paper and Twine Company.

He was a charter member and past president of the National Paper Trade Association, a charter member of the Shaker Heights Country Club and former member of the Cleveland Athletic Club and Roadside Club.

Mr. Bicknell was a brother of the late Warren Bicknell, Annie Laura Todd and Alice Delamater.

Early in his youth Mr. Bicknell, who was the son of the late Mr. and Mrs. Charles T. Bicknell, moved with his family to Massillon, Ohio and later to Cleveland when he became associated with the Union Paper and Twine Company.

Ogden Minton

Ogden Minton, mechanical engineer and inventor, died on Tuesday at his home, 55 Park avenue, New York, after an illness of six months. He was research engineer for the General Foods Corporation and was president of the Minton Vacuum Drier Corporation of Greenwich, Conn., and Montreal, makers of a drying machine for pulp paper which he invented. His age was 59.

Mr. Minton was born in Brooklyn and was graduated from Cornell University as a mechanical engineer. In 1919 he formed the drier firm bearing his name. He also invented an engine to provide homes with their own heat and electric light and devised artificial carbon-dioxide wells. The latter two inventions, although patented, have not been produced commercially.

A widower, he leaves two daughters, Mrs. Daniel Montgomery of Warrenton, Va., and Miss Ann Minton of New York, and a sister, Mrs. Christine Pleissner of Brooklyn.

T. R. Wilbert Joins Elof Hansson

"Gunnar T. Hansson, president of Elof Hansson, Inc., 10 East 40th street, New York City, announces that T. R. Wilbert has recently become associated with his organization to take charge of Elof Hansson Incorporated's Pulp Department and to assist in their paper export department.

The firm of Elof Hansson established about four years ago its own New York office in order to keep a closer contact with its pulp and paper connections in this country.

Before joining the firm of Elof Hansson Mr. Wilbert was connected for the last five years with the sales department of Rayonier, Inc., and was previously employed by Lagerloef Trading Company, New York, for about ten years."

Heads Paper and Cordage Assn.

Carroll T. Gardner was elected president of the Philadelphia Paper and Cordage Association at their regular monthly meeting held on December 15th in the Corinthian Room of Strawbridge & Clothier's.

Mr. Gardner represents the Groveton Papers Company and Henle Wax Paper Manufacturing Company in the Philadelphia and Southern territories and has been associated with the paper industry for

CARROLL T. GARDNER

25 years. He became a member of the Association in 1934 when he was transferred from Baltimore. He served as the association's chairman of entertainment committee until he was elected to the new office succeeding W. J. Culverhouse of the Fort Howard Paper Company.

R. H. Decker Jr., Dill & Collins Inc. and former association treasurer was elected vice president; Charles J. Stokes, Sabin Robbins Paper Company, was elected secretary; Maurice H. Walther, D. L. Ward Company, to office of treasurer. Mr. Culverhouse and Howard Satterthwaite, Garrett-Buchanan Company, were elected to the association's board of directors. Balloting was done by mail and Harry S. Platt, Denny Tag Company, served as Chairman of the nominating committee.

Raybestos-Manhattan in the War

A descriptive booklet, portraying the part Raybestos-Manhattan, Inc. is playing in the War and will play in the postwar era, is being distributed to the corporation's employees, 2,300 men and women in the armed forces, distributors and customers. Included in the booklet are interesting descriptions and photographs of the many activities of the various plants and a message by Sumner Simpson, president.

The purpose of the book, according to Mr. Simpson, "is to broaden your knowledge of our personnel, our products, and our activities, so that you will have a better understanding of Raybestos-Manhattan's place in the industrial life of America." "We have endeavored to make Raybestos-Manhattan a human institution, and we have succeeded, due principally, I think, to the interest our management has had in the working conditions and general welfare of our employees during their working hours," Mr. Simpson says in discussing company-employee relations. "The employees have always felt that if they had personal problems, they could come to the management and talk them over. This we plan to continue and improve through our daily contacts with our employees and our recreational and educational programs."

Also contained in the booklet is an interesting history of the various Divisions which form Raybestos-Manhattan, Inc. These are: The Raybestos Division, Stratford, Conn.; The Manhattan Rubber Manufacturing Division, Passaic and Whippany, N. J. and Neenah, Wis.; United States Asbestos Division, Manheim, Pa.; General Asbestos and Rubber Division, North Charleston, S. C.; The Canadian Raybestos Company, Ltd., Peterborough, Ontario, Canada, and Raybestos-Belaco, Ltd., London, England.

According to present plans, Raybestos-Manhattan, Inc. will issue informative books or magazines several times a year.

Names Waste Paper Committee

Acting upon requests of various members of the wastepaper industry in New York City to form a committee which would cooperate with OPA in the administration of price regulations governing wastepaper, Daniel P. Woolley, Regional OPA Administrator, announced the designation of the following committee:

Patsy Baselice, of Patsy Baselice, Inc.; Andrew Costurino, of Hicks-Costurino, Inc.; James T. Flannery, of Jas. T. Flannery Company; Joseph P. Gaccione, of Gaccione Bros., Inc.; Louis Gottlieb of Louis Gottlieb & Co., Inc.; Walter Martens, of Geo. W. Millar & Co., Inc.; William Roach of Atterbury Brothers, Inc.; Felix J. Troiano of Troinano & DeFina; Paul J. White of Great Eastern Packing and Paper Corporation.

As co-chairman of the committee, Mr. Woolley designated OPA representatives, Morton R. Sarett, regional enforcement attorney, and Julius L. Schapira, area enforcement attorney.

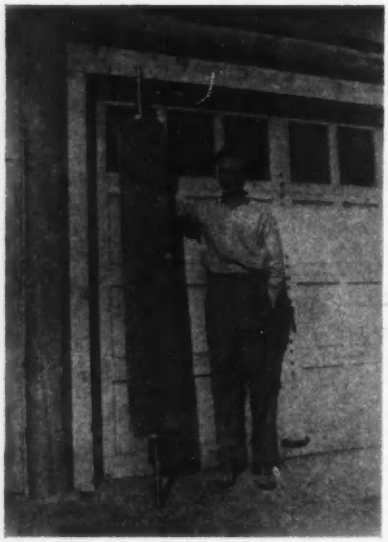
The committee, which will hold its initial meeting on December 28 at the OPA offices in the Empire State Building is the first of its kind in the New York City area.

Sabin Robbins' Representatives Dine

Eastern representatives of the Sabin Robbins Paper Company attended a dinner meeting recently at the Hotel Warwick, Philadelphia, Pa., as the guests of Edward A. McGough, vice president and general Eastern manager, when possible expansion of the firm in the eastern territory and other post-war plans were discussed. The firm was established sixty years ago and has already grown to twenty outlets throughout the country. Those in attendance included: C. A. Dickerson, president; E. A. McGough, vice president, general Eastern manager; C. W. Schank, vice president, general purchasing agent; E. T. Linker; A. S. Humes; W. S. Rosenbaum; J. Horner, division manager, Buffalo; I. L. McJilton, division manager, Rochester; C. A. Dickerson, Jr., division manager, Baltimore; S. C. Radom, division manager, New York City; C. T. Robinson; W. F. McLaughlin; C. J. Stokes; P. L. Riley, division manager, Newark; R. L. Leroux, General Credit manager; B. Dietrich, Philadelphia Sales manager; B. Segal, Controller; Sabin Robbins III, executive vice president.

A Brush of Unusual Size

The illustration presented herewith represents one of the largest brushes used by the paper industry. It is 144 inches long over all, kept free of sag by a metal core, which prevents the warping or splitting, which occurred with the old type wooden core. The bristles used are of nylon, set on the metal core by a special



ONE OF LARGEST BRUSHES USED BY PAPER INDUSTRY

patented process, that makes it possible to re-bristle the brush repeatedly when the bristles are worn down by use. No horsehair is used in this brush. This particular type is used for spraying or sprinkling water on light stock. The manufacturer is M. W. Jenkins' Sons, Inc., of Cedar Grove, N. J.

To Discuss River Pollution

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., December 27, 1944—Paper mill representatives of the Kalamazoo Valley are to be summoned by the state stream control commission to a meeting in Lansing February 19 at which remedies for the Kalamazoo river pollution problem in the vicinity of the plants will be discussed.

The meeting is the outgrowth of consideration by the commission Monday of an offer from the American Pulp and Paper Association's stream improvement committee to undertake research in the valley to develop profitable commercial use for salvaged paper mill wastes. This would result, it is hoped, in cleaning up the river.

Sanction of the commission for the proposed research program of the New York organization was withheld until the research staff has "made clear" its objectives to the paper mills and others who are interested, reports from the Monday commission meeting state.

Milton P. Adams, the commission's executive secretary, said the commission would "explain at the February meeting to the paper mill people and others just what is our objective in cleaning up the Kalamazoo river from Comstock to below Otsego, and make sure that indorsement of any new research plan is not misunderstood as relaxing these requirements."

American Cyanamid Retirement Plan

American Cyanamid Company has announced the adoption of an Employees' Retirement Plan for United States employees of American Cyanamid Company, American Cyanamid and Chemical Corporation, Chemical Construction Corporation, Davis & Geck, Inc., and Lederle Laboratories, Inc. These companies are contributing all of the funds for the cost of the plan, which are to be administered by Guaranty Trust Company of New York under a trust agreement.

The plan is to be effective as of January 1, 1944, and all United States Employees of the above-mentioned companies will be eligible on reaching age 35 and completing two years of service. Normal retirement date will be age 65, except that the normal retirement date of those who had passed their 60th birthday on January 1, 1944, will be January 1, 1949. The plan permits any employee to retire on a reduced pension after reaching age 55 and having had at least ten years of continuous service.

An unusual feature of the plan provides that former employees who have served in the United States Armed Forces since June 30, 1940 and return to one of the above-mentioned companies promptly after their release are credited under the plan with up to a maximum of five years of their war service, as though they had been employed during such period.

Retirement annuities will be credited for past services prior to January 1, 1944 (back to age 35 and completion of two years service) and future service after January 1, 1944, at the following rates:

Past Service:—1% of the employee's annual earnings rate at December 31, 1943, which is over $600 but not over $3,000, plus 1¼% of the excess, multiplied by the number of years of credited past service.

Future Service: 1¼% of the employee's annual earnings, which is over $600 but not over $3,000, plus 1½% of the excess for each year while the employee is a member of the plan.

The plan limits the pension payable to any employee to a maximum of $12,000 a year.

New Moisture Detector

The Colloid Equipment Company, 50 Church street, New York, announces the development of a new Delmhorst Moisture Detector. This new Model R Detector is the result of many years of intensive development work by W. J. Delmhorst in the highly specialized field of equipment for quick moisture determinations and it takes advantage of the latest ideas in electrical circuits and electronic principles, all of which have been simplified and combined in a practical meter which covers the range of 7 to 25% moisture, with an accuracy of plus or minus 1%.

The Model R Detector is complete and self-contained. It is used by forcing the electrode needles into the material being tested and the reading is then taken by simply turning the dial knob until a small light above the dial flashes at the correct moisture content.

The price of this new meter, complete, is $67.50, f.o.b. factory, only made possible through "assembly line" manufacturing methods. Thus, it is now possible for all those having use for equipment of this kind to obtain a simple, rugged, and above all, accurate meter, at a reasonable price.

Scale for Specialized Applications

Sensitivity of the type ordinarily associated with a laboratory balance is combined with the speed and ease of operating an automatic scale, in the Toledo "9190" series made by the Toledo Scale Company, Telegraph Rd., Toledo 12, Ohio. This series had its origin in the Toledo Ration Stamp Counting Scale, which has successfully proven its value in saving thousands of man hours during the war emergency period.

The "9190" may be used either as a general purpose scale, or for specialized weighing problems. Rapid action, durability and a wide choice of charts and equipment make the Model 9190 adaptable to the weighing of small parts, critical quantities of materials, counting, and weighing of test samples. As an example of one of its specialized applications, for use in the paper industry, it is equipped with special holder, and the chart is graduated to show ream weights.

This scale is available for weighing either in grams or grains, and has a capacity of 1500 grains. Graduations are as fine as 2 grains, or 0.2 gram, and the indicator comes to rest quickly—an unusual feature in a highly sensitive scale. The mechanism is simple, with a minimum number of operating parts. Its sturdy carrying case (optional) adds to the compactness and easy portability of the scale, which without the case has overall dimensions of 15¾ inches by 14½ inches.

To Hold Waste Conference

The National Association of Waste Material Dealers, Inc., will hold a Waste and Secondary Raw Material War Industry Conference in Chicago on March 19, 20 and 21. The headquarters for the conference will be the Sherman Hotel, and the program will be built around the slogan which the Association has carried on correspondence since 1941: "Waste Materials Can Win the War—Keep Them Moving."

At a recent war conference called by the National Association of Manufacturers, J. A. Krug, chairman of the War Production Board, in addressing 4,000 members of that association, laid great emphasis on the importance of additional production effort, pointing out that recent events in Europe indicated that production of war materials in many categories would have to be substantially stepped up to meet the present and future needs of the armed forces.

The waste material industry which furnishes a very substantial percentage of the raw materials used by these manufacturers will endeavor through its war conference to do everything possible to stimulate interest not only in the collection of waste materials but also along the lines of moving such material into production channels as speedily as possible. It will be in every respect a conference to consider war problems and every department of the government interested directly in the war effort is expected to be represented. The government's tremendous stake in something like seventy-five billions dollars worth of surplus material and equipment will also be studied.

Reservations both hotel and transportation should be made at least thirty days in advance of the above-mentioned dates and it is important that members of the association and members of the trade should make it clear to the hotel, in making their reservations that they are connected with the waste material industry.

David Graham Leaves WPB

WASHINGTON, D. C., December 27, 1944—The resignation of David Graham as chief of the War Production Board Pulp Allocation Office, effective December 20, was announced today by Benton R. Cancell, acting director of WPB's Forest Products Bureau.

Robert Evans, of New York City, assistant chief of the Pulp Allocation Office for the last three years, has been designated to act as his successor.

"The conscientious service rendered by David Graham for more than two years as the chief wood pulp allocation officer has been of great service to the war effort and the Government in that difficult problem," Mr. Cancell said.

The Forest Products Bureau expressed regret that Mr. Graham's health made it necessary for him to leave the board, and its appreciation of the service he has rendered.

Mr. Graham, born and educated in Ireland, came to the United States in 1927 as a Commonwealth Fellow, and was graduated from the Massachusetts Institute of Technology in 1929 and the Harvard Graduate School of Business Administration in 1931. He formerly was associated with J. P. Morgan & Co., of New York, and the J. Walter Thompson Co., and L. Rose & Co., Ltd., of London. His home is at Scarsdale-on-the-Hudson, N. Y.

Price Rise on Lightweight Papers

WASHINGTON, D. C., December 27, 1944—Ceiling prices for lightweight text papers at the manufacturing level were increased 10% today by the Office of Price Administration, in Amendment No. 6 to MPR-450.

This action, effective January 1, 1945, is to compensate manufacturers for extra costs in producing lightweights, almost the only weights that manufacturers are now permitted to make by the War Production Board.

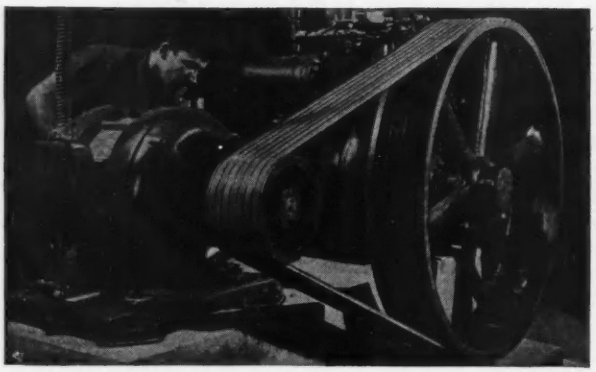
This increase can be passed on by wholesalers to printing establishments, the principal buyers of these papers, and by printers to their customers. Practically all of this paper is used in the production of books, pamphlets, programs, house organs and menus, which are exempt from price control. These papers are not sold at retail.

Manufacturers are "frozen" to their prices between October 1, 1941, and March 31, 1942. They are now permitted to add a straight 10% to these ceilings for text papers weighing 50 pounds or less for 500 sheets measuring 25 by 38 inches.

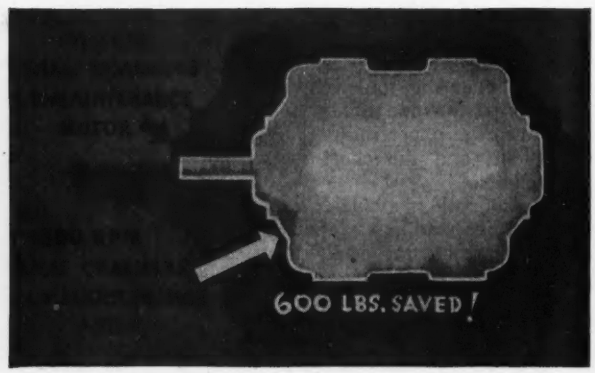
Normally, manufacturers produce text papers with basis weights of 70, 80 pounds or even higher, but since June 1944 the 50-pound limit has been in effect.

It's Time to Look at Motor

➔*You Can Save with High-Speed Instead of*

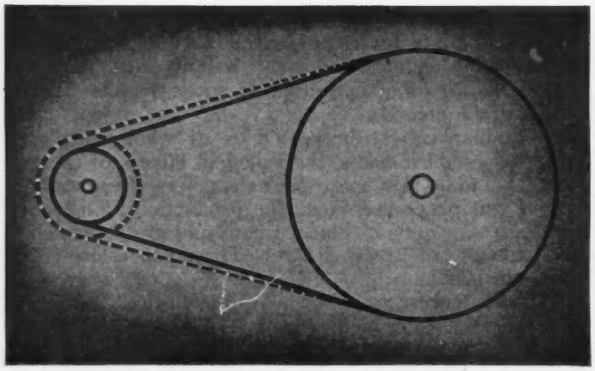


1. In most applications, an 1800 rpm motor with Texrope Drive will ably do the job of a lower-speed, direct-connected motor . . . *and* give you *exactly* the speed you want — *at lower cost!*

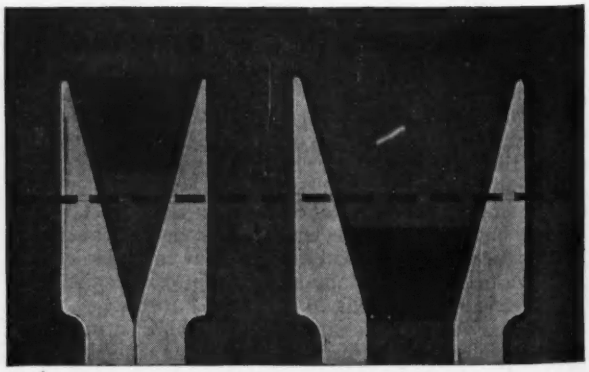


2. When you buy an 1800 rpm instead of 450 rpm 15 hp squirrel-cage motor, for example, 600 lb of critical materials are saved. And *you* save well over $200—with the drive figured in! This saving is typical.

➔*You Can Save with Single-Speed Instead of*



1. Infrequently needed speed changes can be had by changing from one size motor sheave to another. By juggling *complete* drives, speeds can be changed over the full range — from 1:1 to 7:1.

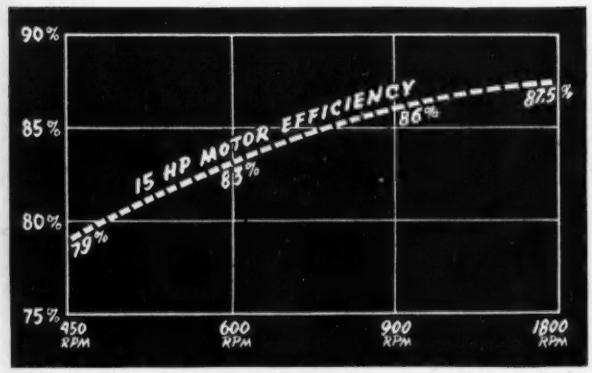


2. With the Allis-Chalmers Vari-Pitch Sheave, you can increase or decrease speed by adjusting sheave diameter, as above. Within limits, an unbroken series of speeds can be obtained.

Take a Fresh Buying!

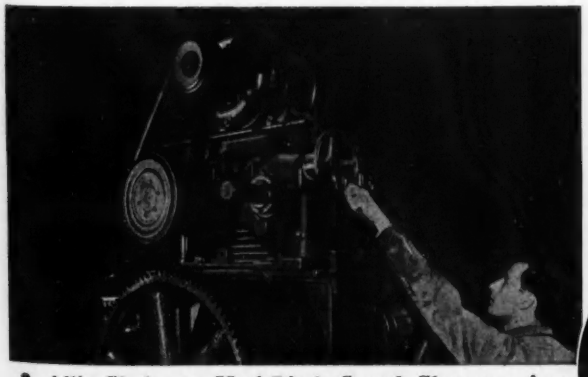
WAR FORCES HIGHER EFFICIENCIES...

Low-Speed Motors...



3. Note that efficiency rises from 79% for a 450 rpm motor to 87.5% for an 1800 rpm motor. Comparing power consumption, the 1800 rpm motor saves you over 30 kwh/24 hr. day.

Multi-Speed Motors...



3. Allis-Chalmers Vari-Pitch Speed Changer gives you infinite changes at the turn of a wheel — within 3.75 to 1. It's the most compact, flexible variable-speed transmission available.

It was good business in peacetime to use — as widely as possible — high-speed motors with Allis-Chalmers Texrope Drives...and single-speed motors with Allis-Chalmers Vari-Pitch Sheaves and Speed-Changers. And it's clearer every day that those material and money-saving practices are *vital* practices in time of war!

TODAY the whole picture of buying and applying motors has changed. Note at the left how much you can save for your country *and yourself* with high and single-speed motors made flexible by Texrope Drives.

As America's only builder of both electric motors and V-belt drives, Allis-Chalmers has long advocated the proper combining of motor and V-belt drive.

And today you benefit from Allis-Chalmers' vast, pioneering experience in this field when you ask for and get the *right* combination of Lo-Maintenance Motor and Texrope Drive! Call your nearby district office. Or write ALLIS-CHALMERS MFG. CO. MILWAUKEE, WISCONSIN.

A 1360

♪ Tune in the Boston Symphony, Blue Network, Saturday at 8:30 pm, EWT.

ALLIS-CHALMERS A-C MILWAUKEE

WE WORK FOR VICTORY WE PLAN FOR PEACE

Announces 1945 Pulp Allocations

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 27, 1944—A total of 2,681,650 tons of wood pulp, approximately the same as was allocated in the fourth quarter of 1944, has been allocated for the production of a minimum of 4,401,963 tons of paper and paper board during the first quarter of 1945, the Forest Products Bureau of the War Production Board announced today.

The scheduled first quarter production of paper board both in total and by type of board is practically the same as the fourth quarter, except that the programed production of waste grades of folding boxboard is increased somewhat. Scheduled production of coarse paper shows increases in grocery bag and wrapping paper and small decreases in gumming paper, envelope paper and asphalting paper. Decreases also were shown in multi-wall sack paper and absorbent papers, officials of the Forest Products Bureau said.

Allocation of wood pulp for the manufacture of various non-paper products, such as rayon, cellophane and plastics, totaled 109,719 tons for the first quarter of 1945, about 4,000 tons more than in the fourth quarter of 1944, chiefly because of an increase in the scheduled production of high-tenacity rayon yarn.

The first quarter allocation of wood pulp for the manufacture of explosives is also somewhat larger than the fourth quarter allocation of wood pulp for this purpose.

A total of 61,281 tons of pulp was assigned for export in the first quarter of 1945, an increase of 20,000 tons over the present quarter, the advance being attributable to greater lend-lease requirements.

The following table shows the tonnages of wood pulp authorized for use in major segments of the industry in the first quarter of 1945 and the required minimum production of paper and paper board, as well as the 1944 fourth quarter scheduled production of paper and paper board in tons.

Sweden Completes New Wallboard Mill

[FROM OUR REGULAR CORRESPONDENT]

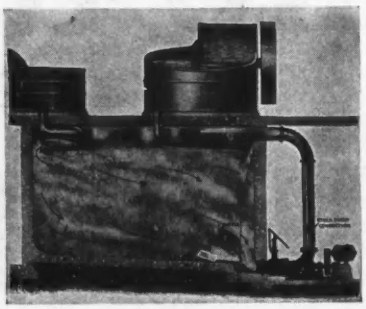
WASHINGTON, D. C., December 26, 1944—A new wallboard factory with a capacity of 10,000 metric tons a year has been completed and put into operation at Wifstavarv, Sweden, says a report received by the Department of Commerce. It replaces the parent firm's sulphate plant in the same locality which was recently closed down because of the declining market for sulphate pulp and inadequate sources of suitable pulpwood.

It is believed that the new plant will have a steadily increasing market for its products since, in addition to the heavy demands which will undoubtedly be placed on the Swedish wallboard industry by the forty countries who were regular customers before the war, the domestic consumption is expected to exceed all previous records as a result of the extensive plans for the alleviation of the present severe housing shortage.

It is not known just exactly what types of wallboard will ultimately be manufactured at this new factory but Swedish wallboard manufacturers in general have never limited themselves to a single type so it can be safely assumed that the output will range anywhere from thin hardboard, like masonite, to the soft types up to 2½ inches thick which are utilized for insulation and soundproofing.

New Murray Pulp Stock Agitator

An improved circulating system of pulp stock agitation, whether used on horizontal or vertical stock chests, is announced by D. J. Murray Manufacturing Company, Wausau, Wis. Illustrated here is the new Murray Pulp Stock Agitator used on horizontal chest, where it is arranged to withdraw the stock and discharge it into the other end of the chest so that the pulp stock flows in one direction, from one end of the chest to the other. This improved method does not require any moveable parts in the chest. It will efficiently agitate the stock in any size or shape of chest. No special chest construction is required. One of its exclusive features is the baffle for directing the flow of the pulp stock to those areas where "dead" deposits of stock are likely to form in the chest. Another feature is the improved method of introducing new pulp stock into the flow tube that quickly mixes it with the stock already stored in the chest. The manufacturer announces that it is furnished complete, ready for installation and designed to fit any existing stock chest. It is patented in the United States and Canada.



Joins Wausau Paper Mills Co.

F. B. McKeehan has joined the Wausau Paper Mills Company, Brokaw, Wis., as director of industrial relations.

Mr. McKeehan comes from Evansville, Ind., where for the past two years he has been associated with the Industrial Relations Department of the Republic Aviation Corporation and its subsidiaries.

Prior to the time with Republic, he was associated with the Industrial Relations Department of Marathon Corporation, of Rothschild, Wis.

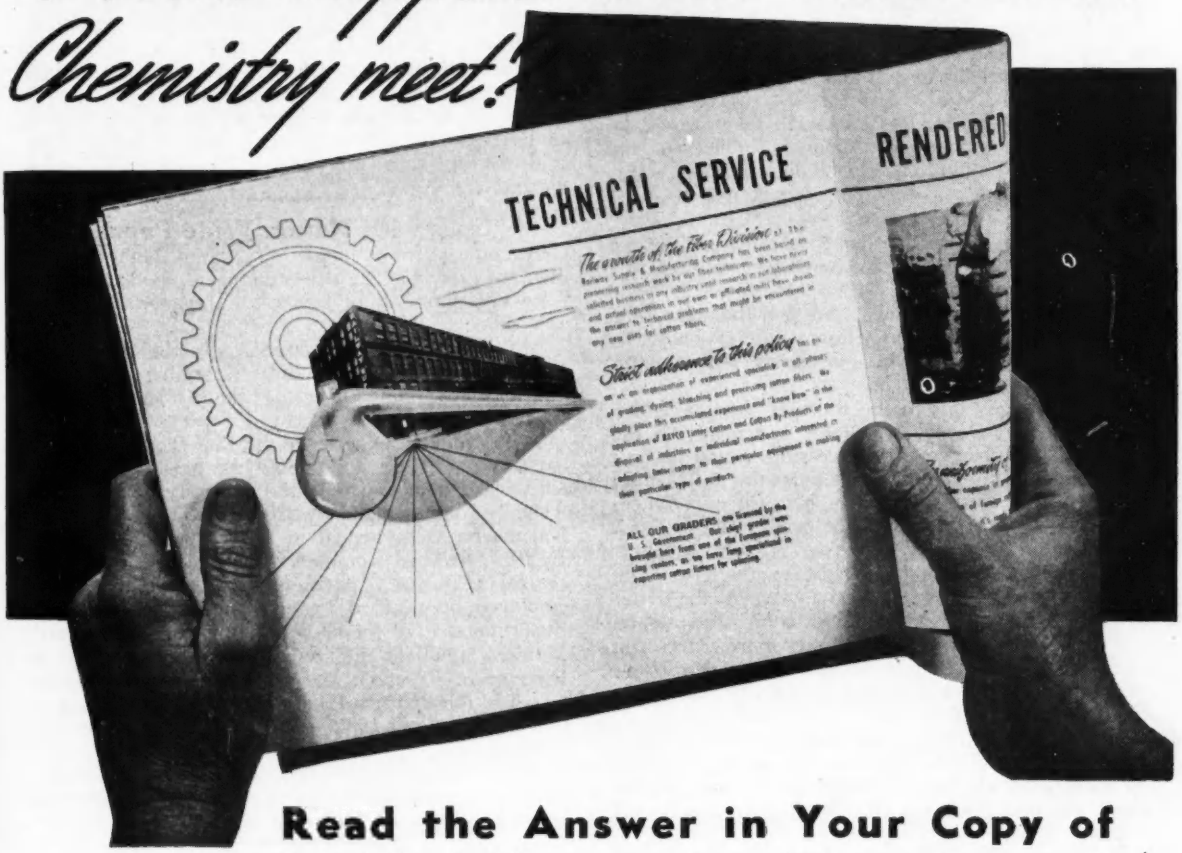
Mr. McKeehan has been active in the organization, instruction, and supervision of first aid, fire prevention, and industrial safety under the supervision of the Wausau School of Vocational and Adult Education.

Michigan Superintendents Meet

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., December 26, 1944—Forty-three members of the Michigan division of the American Pulp and Paper Mill Superintendents Association heard a talk by W. R. Harris, Pittsburgh, at the Park-American hotel Thursday evening of last week. Mr. Harris is a member of the industrial engineering department of the Westinghouse Electric and Manufacturing Company. His subject was a technical presentation of rototroal applications in the paper industry. Plans were discussed for the joint meeting January 11 at the Park-American hotel with the Kalamazoo Valley section of the Technical Association of the Pulp and Paper Industry.

What happens when Cotton and Chemistry meet?



Read the Answer in Your Copy of "Added Honors for King Cotton"

IN industry after industry, modern research and new chemical techniques are expanding the usefulness of cotton and cotton by-products.

The story of this development, and particularly how it is helping the makers of fine paper solve their raw material problems through the use of RAYCO Linter Cotton (selected, carefully graded cotton linters), is told briefly but comprehensively in the new booklet, "Added Honors for King Cotton," just published by The Railway Supply and Manufacturing Co.

In pictures and brief descriptive text it also traces the long years of experience in cotton fiber selection and processing combined with continuous research, by reason of which RAYCO is able to render paper manufacturers helpful technical guidance in simplifying their manufacturing procedure, speeding production by the use of RAYCO Linter Cotton.

We are sure every maker of fine paper will find this new book well worth reading carefully, and we are glad to place a copy in the hands of every paper mill management and operating executive. If you have not yet received it, a copy will be forwarded to you upon request, without obligation.

THE RAILWAY SUPPLY & MANUFACTURING CO.
AND AFFILIATES
General Offices: Cincinnati, Ohio
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Specialists in Grading, Marketing and Processing Cotton Fibers...

Russia's Forests Is Matter of Concern

Russia is one of the unknown factors which is troubling the pulp and paper industry the B. C. forest enquiry heard when Harold S. Foley, president of Powell River Company, declared there was an enormous stumpage of forests there.

Mills in Finland may have been moved into Russian territory and whether more plants have been built is not known. In any event the timber is not exhausted by any means.

He agreed with H. R. MacMillan there would be difficulty in shipping out northern timber via the Arctic. "But, I'm quite positive," declared Mr. Foley, "that Balkan and Persian Gulf ports will be used as outlets of Russian timber."

Mexican logs were also being sold, with only one sawmill known. Outlook in British Honduras was also for good production.

"Our experience in Cuba and the Bahamas," he said, "was such that our efforts will probably be confined to countries where there is not a Latin element."

Despite suggestions to the contrary from Enquiry Counsel H. W. Davey, Mr. Foley was firmly of the opinion that timber not now accessible would become so in British Columbia, partly because the mills would reach out for them and partly because experiences in mechanical warfare would be serviceable in truck logging after the war.

The profit element is not always the governing element, he informed Mr. Davey when the latter argued lower world prices might alter the picture. "As original growth timber becomes more scarce you reach out for that other timber rather than close your mill. It is very doubtful whether world prices will delay accessibility."

Mr. Justice Sloan suggested that the future valuation of accessibility depended on the selling price of the finished article compared with production factors within the operator's control and factors outside his control.

Mr. Foley instanced that at least operators could continue logging for a time without the depreciation factor. The majority of timber was within 15 miles of water.

Farris Venturi-Type Safety Valve

The Farris Engineering Company, manufacturer of precision valve specialties, announces the development of a line of Venturi-Type Safety Valves with special provisions for constant accurate blow-off, exceptionally great capacity, complete tightness of re-seating, minimum escape of vapor into the surrounding space, and elimination of angular distortion and fouling.

The inlet venturi tube nozzle of this design gives a clear unobstructed port and guided high velocity of the steam, which results in high lift and correspondingly great capacity. One of the many outstanding features of these valves is the patented "separator bell." This device causes the steam to make three changes in direction before passing into the atmosphere, and includes a drain for the condensed moisture into the body. Escape of vapor into the air is thereby minimized. The "separator bell" also helps to keep the spring cool by preventing steam from striking the spring, and improves freedom and maintenance of alignment by providing for higher support of the spring than in other designs.

Correct alignment of the stem, on which complete tightness of re-seating depends, is further maintained by precision machine work throughout the valve, and by top guidance of the stem in two bearings, instead of one or three as employed in other designs. This two-bearing construction, which has been demonstrated to be ideal for the purpose, eliminates angular distortion, minimizes fouling of guiding areas, and provides maximum ease of maintenance besides assuring greatest accuracy of re-seating.

Further information concerning the design, ratings and sizes of these safety valves can be obtained by addressing Farris Engineering Company, Palisades Park, N. J.

Goes with Nation Wide Paper

Announcement is made by Nation Wide Papers Inc., of the election of William K. Kidder as its Vice-President and General Manager, effective December 1, 1944.

Mr. Kidder recently retired from the position of Regional Paper Commodity Specialist with the Chicago Regional Office of the Office of Price Administration.

Mr. Kidder's experience in the Paper Industry dates from 1925 following his graduation as a Chemical Engineer from the University of Michigan, when he was engaged by the Allied Paper Mills at Kalamazoo as a chemist in their general laboratory. In 1927, he was promoted to be Chief Chemist and remained in that capacity until 1932 when he was employed by Oxford Paper Company as Technical Superintendent of their Coating Division at Rumford, Maine. In 1936 he returned to Kalamazoo as Director of Research and Sales Service Representative for the Bryant Paper Company, remaining in this capacity until 1942 when he entered the Government service.

Nation Wide Papers Inc., have opened a Chicago office in the Conway Building where Mr. Kidder will direct its sales and merchandising activities.

E. B. Anderson Opens New York Office

Erick B. Andersen announces the opening of his office at 522 Fifth avenue, New York for the purpose of dealing in paper and allied commodities. "We are, at present, in position to offer limited tonnage and we will be in full swing by the first of the year," says Mr. Andersen. "Definite arrangements have been made with Captain Rolf B. Andersen, United States Army Air Force, and he will join us upon the termination of his military service. We intend to start on a moderate scale but shall do our utmost to keep alive the precedent and tradition set for us by the late Jack Andersen.' '

Honored on 50th Anniversary

On December 20, Miller, Tompkins & Co., East Rutherford, N. J., manufacturers of multi-wall paper shipping sacks, commemorated their fiftieth anniversary.

A feature of the event was a reception to the president of the corporation, Francis J. McKee. He is the only remaining member of the original founders of the firm and has always been and still is very active in its affairs.

Mr. McKee was honored with the presentation of a bouquet of American Beauty roses and a very handsome traveling toilet case, suitably engraved, by his associates.

EVAPORATORS

(Film Type and Forced Circulation)

and

FILTERS

The demands of a war-time nation, dedicated to an all-out victory effort, upon its existing industrial sinews preclude the manufacture of new machinery and in some cases, of replacement parts. Reconditioning and rehabilitating existing equipment are the answers to the problem of maintaining efficient and economical operation with over-worked equipment.

Goslin-Birmingham's Engineering Staff is thoroughly experienced in renewing the life of existing equipment. G-B's Consulting Service is available to you without obligation on your part.

Your inquiries are solicited.

GOSLIN-BIRMINGHAM MFG. CO., Inc.
BIRMINGHAM, ALABAMA

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CHICAGO · NEW ORLEANS
SAN FRANCISCO · SEATTLE

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending December 23, 1944

STOCKS

	High	Low	Last
A. P. W.	4⅝	4⅜	4½
Armstrong Cork Co.	45¼	43½	43½
Celotex Corp.	14⅜	13⅞	14¼
Celotex Corp., pf.	19½	18⅝	19
Certain-Teed Products Corp.	7⅛	6¾	6¾
Certain-Teed Products Corp., pf.	129	126	126½
Champion Paper & Fibre Co.	30¼	29	29½
Champion Paper & Fibre Co., pf.	113½	113	113
Congoleum Nairn Co.	28⅞	26½	28¼
Container Corp. of America	29¼	28¼	28¾
Continental-Diamond Fibre Co.	11⅞	10¼	11¾
Crown-Zellerbach Co.	22¼	21¾	21¾
Crown-Zellerbach Co., pf.	103⅞	103⅝	103⅞
Dixie Cup Co.	19¼	18	18
Dixie Cup Co.,—A.	49	47½	49
Flintkote Co.	24	23¼	23⅜
Flintkote Co., pf.	111¾	109	109
Robert Gair	4⅝	4⅜	4½
Robert Gair, pf.	16¼	15⅞	15⅞
International Paper Co.	21¾	20¼	20⅝
International Paper Co., pf.	92¾	92	92
Johns-Manville Corp.	105	103⅛	103⅛
Johns-Manville Corp., pf.	..	..	..
Kimberly-Clark Corp.	38	38	38
Mac Andrews & Forbes	29⅜	28⅝	28¾
Mac Andrews & Forbes, pf.	147	147	147
Masonite Corp.	42½	40½	40½
Mead Corp.	13	12⅜	12⅝
Mead Corp., pf. A—6%	..	..	..
Mead Corp., pf. B—5½%	94	93½	94
National Container Corp.	13¼	12⅞	13
Paraffine Companies, Inc.	56	56	56
Paraffine Companies, Inc., pf.	..	..	..
Rayonier, Inc.	17⅜	16¾	16¾
Rayonier, Inc., pf.	34¾	34½	34½
Ruberoid Co.	34¼	32⅝	32⅝
Scott Paper Co.	41½	40¾	40¾
Scott Paper Co., pf.	109	109	109
Sutherland Paper Co.	33½	33¼	33½
Union Bag & Paper Corp.	15¼	14¾	15⅛
United Paperboard Co.	6½	6½	6½
U. S. Gypsum Co.	80½	78	79½
U. S. Gypsum Co., pf.	182¼	180	180
West Virginia Pulp & Paper Co.	24¼	23½	23¾
West Virginia Pulp & Paper Co., pf.	..	..	..

BONDS

Abitibi Pulp & Paper Co. 5s '53	110¾	107⅞	109⅛
Celotex Corp. 3¾s '55	..	..	..
Certain-Teed Products Corp. 5½s '48	102	101⅜	101¾
Champion Paper & Fibre Co. 4¾s '50	..	..	..
International Paper Co. 6s '55	106¾	106	106½
International Paper Co. 5s '47	105	104¼	104⅜
Mead Corp. 3½s '53	..	..	..

New York Curb Exchange

High, Low and Last for Week Ending December 23, 1944

STOCKS

	High	Low	Last
Great Northern Paper Co.	35¾	35½	35½
Hummel-Ross Fibre Corp.	7⅛	6⅝	6¾
St. Regis Paper Co.	6⅛	5⅛	5¾
St. Regis Paper Co., pf.	..	..	..
Taggart Corp.	5⅞	5¾	5¾

BONDS

American Writing Paper Co. 6s '61	..	..	..

Marathon Corp. Issues Report

The Marathon Corporation reports gross sales of $29,856,031, an increase of $4,471,771 or more than 17 per cent above 1943, and net earnings available to stockholders of $1,603,000, in comparison with $1,286,000 in 1943, were shown in the annual report of Marathon Corporation, Rothschild, Wis., by D. C. Everest, president, at the annual meeting of stockholders on December 21.

The report, covering the year ending October 31, showed that net earnings represented an increase of $317,000, or 24%, over 1943, after provisions for income and excess profit taxes totaling $4,375,628 had been made. The taxes for 1943 aggregated $3,721,921.

Profits available to common stockholders were equivalent to $3.75 per share on stock outstanding.

The regular quarterly dividend on preferred stock was declared, payable January 2 to holders of record as of December 20.

Officers were reelected but two changes were made in the board of directors. Phillip D. Armour, Chicago, Ill., was named a director to succeed his brother, Lester Armour, now a naval officer on active duty, and J. S. Alexander, Wausau, Wis., was elected to succeed his brother, the late Ben Alexander. Other directors are Allan Abrams, Mr. Everest, C. S. Gilbert, Aytch P. Woodson, L. F. V. Drake and John Stevens, Jr., Wausau; M. P. McCullough, Chicago; C. J. Winton, Jr., Minneapolis, and Leo E. Croy, Neenah, Wis.

Officers include: Mr. Everet, president; Messrs. Stevens, Croy and Abrams, vice presidents; A. M. Van Douser, secretary-treasurer; R. M. Altman, assistant secretary-treasurer, and F. P. Johnson, controller.

Donnacona Co. Nets 51 Cents

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 26, 1944—The Donnacona Paper Company has declared a dividend of 25 cents as a half-yearly payment, which is taken here to suggest that the stock has been placed on an annual basis of 50 cents a share. A previous payment, made September 1, was 25 cents a share, and it marked the first disbursement since 1941, when an initial dividend of 10 cents a share was paid. There are 376,572 no-par-value shares outstanding. The annual report for the year ended December 31, 1943, issued last February, showed a substantial improvement in earnings. Net profit was $194,846 or 51 cents a share, against $105,837 or 28 cents a share in 1942. At the same time, net working capital was increased sharply from $1,872,000 to $2,511,000, while funded debt was reduced by $567,000.

Masonite Earns 46 Cents

The Masonite Corporation reports for the first quarter of three months ended November 30, 1944, net profits of $317,209, or 46 cents a share on the outstanding common stock of 600,000 shares, after provision for preferred dividends and after all charges, including income taxes, subject to final audit. The comparative net profit for the first quarter of the previous fiscal year was $282,554, equal to 41 cents a share, after preferred dividends, on the basis of 600,000 shares of common stock.

Puget Sound Votes Dividend

The Puget Sound Pulp and Timber Company has declared a dividend of 25 cents a share on the common stock payable December 30 to stockholders of record December 18, 1944. Including this payment, a total of $1 a share on the common stock has been declared or paid in 1944.

The regular quarterly dividend of 30 cents a share on the preferred stock was declared payable January 1, 1945 to stockholders of record December 16, 1944.

Cheboygan Mill to Reopen

CHEBOYGAN, Mich., December 26, 1944—The North American Pulp and Paper Corporation mill, which has been closed for some time, has been sold. It will reopen about January 1 as the Paper Corporation of America.

Maurice Landy, Reading, Pa., president of the new firm, has announced that the plant will employ 125 men.

Pulpwood Production Down

Although mill receipts of domestically cut pulpwood during the first nine months of 1944 were encouraging, a sharp production decline since September in some regions and dwindling inventories constitute a serious threat to 1945 wood pulp production, according to a joint statement of the Conservation Committee of the Waste Paper Consuming Industries and the War Activities Committee of the Pulpwood Consuming Industries.

"Thanks to the active cooperation of the newspapers, the farm press, county agents, foresters, farm groups and government agencies," the statement says, "the pulp and paper industry has been able to fulfill most of its wartime obligations in 1944. But unless pulpwood production can be stepped up during the early winter, some mills will have to close or curtail operations before spring. This is the season when mills should be building up wood inventories against winter conditions that make transportation difficult if not impossible.

"There is no shortage of wood to cut, but there is a serious shortage of manpower and transportation. The U. S. Victory Pulpwood Campaign aims at overcoming these shortages. The War Activities Committee in advertising every month in 825 weekly and daily newspapers and coordinates industry activities with those of other interested groups.

"Cooperating in the pulpwood drive are the ANPA Newspaper Pulpwood Comittee, of which Walter M. Dear, publisher of the *Jersey Journal*, Jersey City, is chairman, the Farm Press Forest Products Committee headed by Irving Ingalls, of the American Agriculturist, Ithaca, New York, and the Periodical Publishers National Committee whose managing director is Arch Crawford, of the Curtis Publishing Company.

"Unless pulpwood production can be increased during the early winter, some mills will have to curtail or cease operations early in 1945.

"The Commerce Department this month reported that 'the bottom of the barrel' has been reached in wood pulp inventories. October inventories were 30 percent under a year ago and about 62 percent below October, 1942. Inventories have been gradually declining since the middle of this year.

"Although pulpwood production up until early fall reached the highest point since May, 1942, consumption has kept a jump ahead of new supply because of the pressing wartime needs for wood pulp. Inventories consequently have dwindled.

"Total domestically-cut pulpwood, delivered to the mills, probably will exceed 15,000,000 cords in 1944—2,000,000 more cords than in 1943—as a result of the combined efforts of groups engaged in the U. S. Victory Pulpwood Campaign.

"It will be seen from these facts that immediate action must be taken to collect waste paper and cut pulpwood in order to prevent the war production schedule from breaking down. It is likely that the pulp and paper industries will be one of the last major consumer goods industries to achieve a production level equal to demands."

Demand Is Excessive

INDIANAPOLIS, Ind., December 26, 1944—Little occurred in the paper market here last week which would offer any encouragement to manufacturers or jobbers. The whole difficulty is that demand is so far ahead of supply that the trade hardly knows which way to turn.

Paper mills are encouraged with the volume of waste paper being collected in the state up to the present time. With the coming of severe weather, however, mills are afraid collections will drop off materially.

Demand for roofing and building paper continued good last week. The volume of building in this area has been about three times what it was last year, but most of the new construction was for industrial and business buildings. Little improvement was shown in residential construction and no improvement is possible until priority restrictions are eased further.

Box and container demand continued heavy. Most all the holiday deliveries have been made, but the ordinary demand is more than the trade can supply. Civilian demand is being restricted as demand from governmental agencies continues to expand slightly. Industries such as dairymen and poultrymen are getting most of their requirements, but some other users of paper board containers are finding the situation difficult. No improvement has been seen in the labor situation in container factories. In fact reports show a decline in available labor in this area.

Mill demand for waste paper continued heavy last week with calls for more than the local trade could supply. It is reported that boxes and kraft paper are needed badly. Prices were all at ceiling levels. Demand for rags also was good with new cuttings wanted. Rags for roofing grades dropped off slightly, but all prices were at ceiling.

Armstrong

INVERTED BUCKET TRAPS

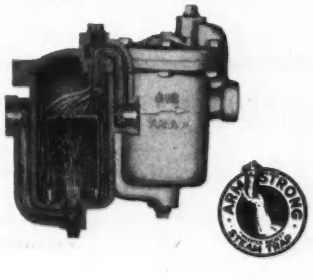
Worry Chasers for Maintenance Men

ANOTHER reason why Armstrong inverted bucket steam traps are favored in the paper and other industries is the absence of the usual bother and waste with cracked valves or other less efficient methods of draining condensate.

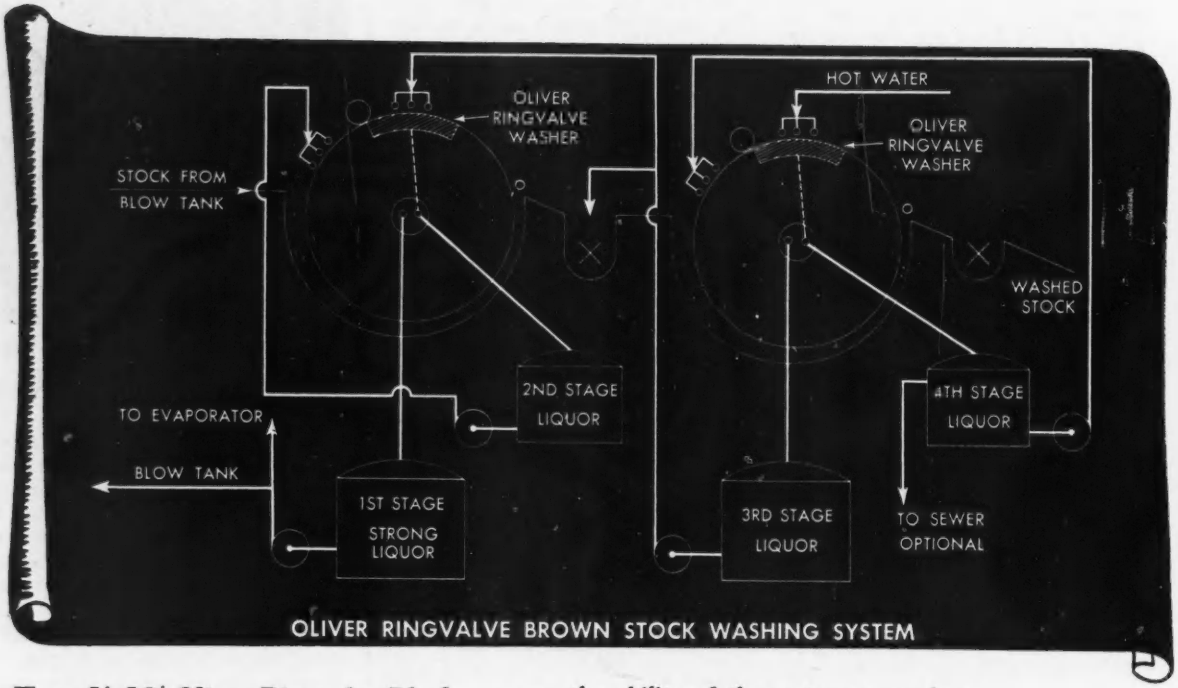
Maintenance is negligible with Armstrong traps for a number of reasons. The inverted bucket principle causes the condensate to swirl up and around the bucket, keeping scale, dirt and sludge in suspension until discharge. The free-floating valve, with fast opening and closing action, prevents wire-drawing. The use of chrome steel, heat treated after machining, for valve and seat parts minimizes wear and corrosion, and the hemispherical valves always seat perfectly.

These maintenance reducing factors have been amply proved in service. Example: One user reported 50% less trap maintenance with Armstrongs than with the traps they replaced. For a complete treatise on trapping write for the Armstrong Trap Book.

ARMSTRONG MACHINE WORKS
818 Hoffman Street
Three Rivers, Michigan



Flow Diagram of a Recently Ordered 240 TON OLIVER RINGVALVE B. L. WASHING SYSTEM



OLIVER RINGVALVE BROWN STOCK WASHING SYSTEM

Four 8′x12′ Oliver Ringvalve Black Liquor Washers are to be installed in a twin counter-current washing system, each line to handle about 120 tons per day making a total of 240 tons for the system.

Here are a few of the reasons why Oliver Ringvalve were the choice of the buyer:

1 **the ability of two Oliver Ringvalves in series to wash and rewash the tonnage that would normally require three ordinary washers plus a rewasher.**

2 **the ability of the system to produce clean pulp with a minimum of wash water and to recover a maximum of chemicals.**

3 **the ability of either line to handle up to a 100% overload, if occasion demands, without sacrificing clean pulp.**

These advantages are not theories, *they're facts.* The Oliver Ringvalve long ago proved its great economic and operational superiority as a black liquor washer.

OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

San Francisco 11
California

Canada:
Sales & Manufacturing Representative
E. Long Limited

Chicago 1, Ill. –
221 N. LaSalle Street

Western Sales Division
Oakland 1, California
2900 Glascock Street

Factories: Oakland, Calif.—Haxleton, Pa.—Orillia, Canada—Melbourne—Australia

In Sulphite-Mill Service

Cooper offers the experience of sixteen years in the application of stainless castings to the individual and special requirements of sulphite-mill service. There are Cooper stainless castings that were installed in 1928, and still in service. They stand up.

THE COOPER ALLOY FOUNDRY CO. 145 BLOY ST., HILLSIDE, N. J.

THE *Cooper* ALLOY FOUNDRY CO.
STAINLESS—MONEL—NICKEL

THE *Only* ALLOY FOUNDRY WITH *All* THESE FACILITIES

- Laboratory control over raw materials and finished products.
- Dual foundry . . . both hand and machine molding.
- Electric arc and high-frequency-induction melting furnaces.
- Centrifugally-cast castings.
- Heat treating of Castings up to six feet.
- X-ray and Gamma-ray inspection.
- Precision Castings.
- Machine shop . . . specially equipped for finishing stainless steel.
- Improved cleaning . . . including Lustra-cast electrolytic finishing which leaves all surfaces bright.
- Castings furnished rough, polished or fully machined . . . one ounce to two tons.
- Development of special alloys to meet unusual requirements.
- Technical consulting service.

Forest Committee Meets

A conference of pulp and paper producers with the lumber manufacturers on matters of joint interest was held at the Blackstone Hotel in Chicago on December 12 under the auspices of the Forest Industries Council of which Frederick K. Weyerhauser of St. Paul is Chairman. Reports from the state chairmen of the Forest Industries Information Committee were given. E. W. Tinker, American Paper and Pulp Association, New York, is chairman and Donald M. Rochester is secretary of this committee. State reports of special interest were from Minnesota and Wisconsin. L. A. Furlong, Minnesota and Ontario Paper Company, chairman of the Minnesota Committee, reported in detail activities in connection with the legislative Interim Committee concerning recommended reforms in state tax legislation necessary to encourage the private growing of timber, adequate appropriations for the Minnesota Division of Forestry, and plans for better forest fire control. He described the publicity campaign of education directed to the citizenry of Minnesota wherein he stated the value of pulpwood processed in Minnesota during 1943, plus other forest products shipped out of the state amounted to an estimated $75,000,000.

In the absence of Folke Becker, Rhinelander Paper Company, chairman—Harold S. Crosby, secretary, read the Wisconsin report. This report described studies made in connection with Wisconsin forestry and told of a recent stimulated interest in the field of private forestry, particularly by the pulp and paper companies. The effectiveness of fire control in Wisconsin rendering standing timber a good risk, certain tax reforms in the past with others in prospect and the need for contiguous timber supply have combined to produce a real leadership in industrial forestry. The plan of organizing and certifying "Industrial Forests" in cooperation with the Wisconsin Conservation Department bore out this assertion, with applications already received covering about 200,000 acres. Mr. Crosby declared that because of the progress of the committee the forest industries who were indulging in these activities bearing upon the public interest were enjoying a greater public acclaim than ever before. Other reports came from chairmen from Tennessee, Carolinas, Georgia, Louisiana, New England and the Western timber states.

Make Investigations for Pulp Mill

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 23, 1944—The new Co-operative Commonwealth Federation (better known as the CCF) government which achieved power last mid-July in Saskatchewan appears determined to carry out its program of state and co-operative industry, and among other enterprises, a pulp mill for the northeastern section of the province and a wallboard plant are mentioned as early possibilities.

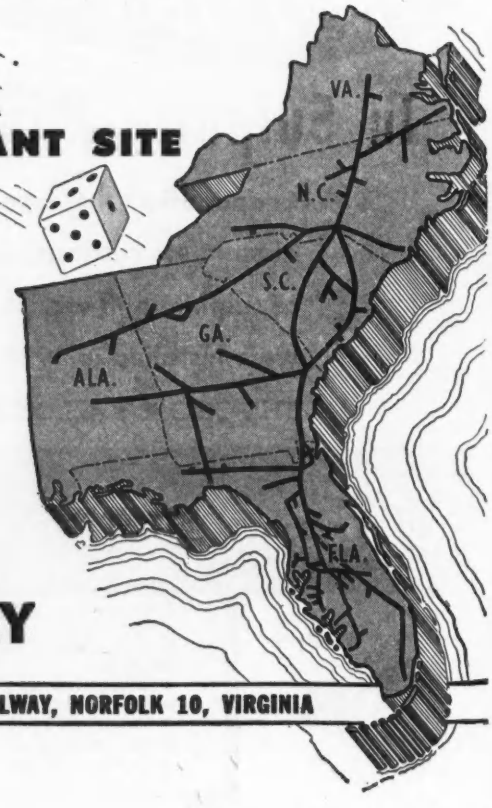
Little is known concerning the plans of the new Saskatchewan government pulp mill proposition, but it is understood that investigations are proceeding. *"Financial Post"* says the cost has not been determined "but is believed to run to a high figure." Keeping in mind that so far there has been only one bond issue announced, and that for a paltry million dollars, out of which all these enterprises, and some others, are to be financed, one begins to wonder how much is "a high figure."

DON'T GAMBLE

IN SELECTING A PLANT SITE

Let us apply the facts and figures gained through years of experience to help you select the location where you can operate with the greatest economy.

Our services involve no obligation, and all inquiries are treated confidentially.



SEABOARD RAILWAY

Write

DALLAS T. DAILY, GENERAL INDUSTRIAL AGENT, SEABOARD RAILWAY, NORFOLK 10, VIRGINIA

Explains Print Paper Situation

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 27, 1944—Although the shortage of print paper is expected to continue in the first quarter of 1945, quotas of printers and publishers will not be curtailed further provided no unforeseen demands arise, members of the Magazine and Periodical Industry Advisory Committee were told by War Production Board Forest Products Bureau officials at a meeting last week, WPB reported today.

If the present demands of all claimant agencies for printing paper were filled in full, there would be a deficit of more than 40,000 tons, but, in view of the careful screening that has eliminated all but essential requirements, it is believed supplies can be stretched to meet necessary demands without dipping further into decreasing inventories of pulp and paper, the officials said.

WPB is doing its utmost to increase production of wood, pulp and paper, and hopes that the pulp and paper industry may be reinstated on the production urgency list, the officials said. If production can be increased and demands reduced, a cut in paper usage in the second quarter of 1945 may be avoided, but the second quarter outlook is less bright than that of the first, they added.

It is hoped that by July of next year Canada's wood and pulp production may be increased; less Army nitration pulp may be required; domestic production of pulpwood may be stepped up; and waste paper collections will increase, WPB said. One optimistic note was struck when it was reported that so far this quarter there had been few complaints of non-delivery of paper to printers and publishers of magazines, indicating that paper mills are doing their utmost to maintain delivery schedules, WPB added.

A task group appointed to study plans for reconversion rendered an interim report and was asked to continue its investigation.

Charged with Violating WPB Order

S. Safier, Inc., Jersey City, N. J., paper supplies distributor and paper plate manufacturer, has been charged with violation of WPB Order M-241-a and directed to cut 199 tons of pulp, paper and paper board from its usual consumption quotas before December 30, 1945, the Compliance Division of the War Production Board reported today.

WPB Suspension Order S-624, issued today and effective December 30, 1944, extends for one year unless the firm subtracts 199 tons from its permitted paper consumption prior to the end of 1945.

The Safier firm distributes wrapping paper, paper bags and other products, besides manufacturing paper plates.

This manufacture represents less than two per cent of its business, WPB said.

During 1943, the firm consumed 124 tons of paper board in excess of its quota, as established by WPB Order M-241-a, which restricts manufacture of specified paper-converted products, according to WPB. In the first quarter of 1944, the paper supply company again exceeded its consumption quota, by 75 tons of paper, WPB charged. Responsible agents of the corporation are also charged with failure to maintain accurate and complete records of inventories and production, as required by Order M-241-a and Priorities Regulation No. 1, Compliance Dvision officials said.

We're in it for the duration

SINCE 1828

Continuously We Have Served The Paper Industry.

Since War II was declared we have used all our manufacturing facilities, and done our small part to help build our fighting machine for war.

At the same time we have been planning for peacetime equipment and improvements NOW!

We have some of our machines available to produce new machinery for civilian products.

Paper Machines
Paper Bag Machines **Paper Cutters**
Can be built with a PDIA Priority rating.

THE SMITH & WINCHESTER
MANUFACTURING COMPANY
PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT

Westminster to Build

Further details are now available regarding the $1,250,000 expansion program to be launched by the Westminster Paper Company Ltd. at New Westminster, B. C. Contract has been placed with the Dominion Construction Company Ltd. for the building involved in this program, according to E. M. Herb, vice-president and general manager.

The construction program calls for erection of a 111 x 126 foot expansion to the finishing room. This new wing will be 3½ stories in height. In addition, a new boiler house and machine room will be erected. This building will be 177 x 130 feet and two stories in height. The machine room and boiler house will be of re-enforced concrete, while the machine room will be of concrete with steel trusses.

The present wharf will be removed and completely rebuilt and extended along the entire length of the water front owned by the company. Sheet piling will be used in the wharf construction, which will allow for the handling of fuel with storage bins, the unloading of wood pulp which comes to the plant from mills up the coast, and will also provide a loading dock for scows taking on board export shipments for transshipment to trans-Pacific liners.

In addition to the new plant building, a new office building will be erected and has been designed to tie in with a similar structure which is being erected for an adjoining industrial plant. The present office will be merged into the main building.

With the completion of the new plant the capacity of the mill will be doubled while the present payroll running around 235 will be increased to 400 persons.

Bulk of the money required for this expansion comes from present shareholders in the company who were given first chance to pick up the new stock issue at a par value of $10 a share.

The financial standing of Westminster Paper Company Ltd. was reflected on the Coast recently when, inside of six hours, the entire new issue was snapped up by present shareholders to the extent that some applications had to be reduced in size by the financial house handling the flotation.

Machinery for these new buildings has been under design, construction and test over a period of months and will represent the most modern of its kind, embodying the work of experts preparing for the postwar business.

"Corrosion"

"Corrosion," a 54-page publication issued by the International Nickel Company, is a convenient and comprehensive analysis of corrosion principles for both the practical man and the technician in the metal field. It has been prepared in the belief that a good working knowledge of corrosion is the best possible means of securing maximum equipment life and minimum maintenance costs in situations where this destructive process must be taken into consideration.

An opening section explains how corrosion processes work, and discusses all the known factors that influence their action: acidity of solution, oxidizing agents, temperature, agitation, films, inhibitors, surface condition, stress, heat treatment, welding, concentration cells, and galvanic action. These discussions are illustrated with graphs, drawings and tables.

The detailed review of testing methods that follows tells how service conditions are simulated in corrosion research. Included is a description of the construction and use of the well-known spool-type specimen holder for determining the comparative behavior of several metals and alloys simultaneously under actual operating conditions.

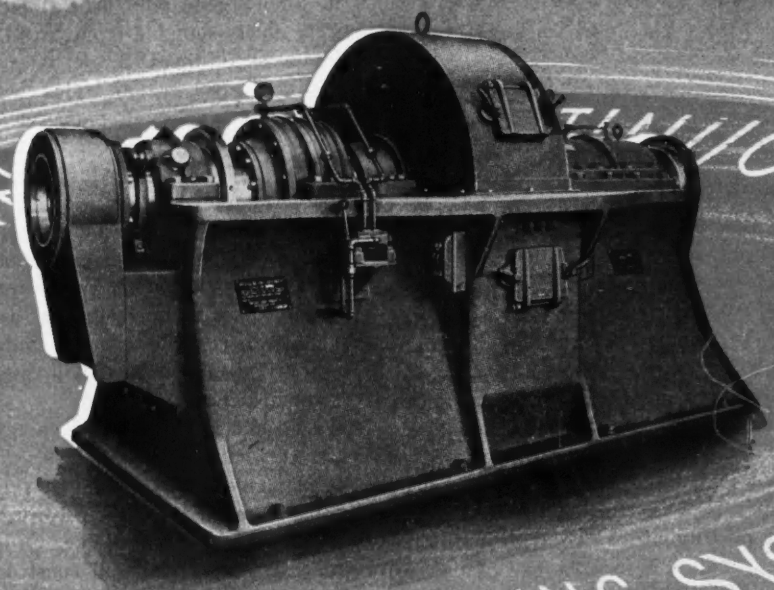
The applicability of Monel, nickel and Inconel in various corrosive media is analyzed in the closing section of "Corrosion." Tables list nearly 500 typical corrosives in which these alloys have been successfully used, and report the results of more than 120 specific tests under varied conditions in 44 common corrosive agents.

"Corrosion" will be sent on request to equipment designers, engineers, or other metal users, by The International Nickel Company, Inc., 67 Wall street, New York 5, N. Y.

Uruguay's Paper Imports

Imports of paper and products into Uruguay in 1943 declined about 6 percent from the 1942 level, according to a report received at the Department of Commerce. Newsprint was the only item which registered an increase over the previous year, imports in 1943 being about 20 percent more than in 1942. Statistics for various classifications in 1943 were as follows—1942 figures in parenthesis: newsprint, 10,107 short tons (8,378); printing paper, 1,422 short tons (3,550); wallpaper, 84,571 pounds (161,114); and cardboard, 418 short tons (719).

SUTHERLAND *continuous beating and refining system*



BEATING AND REFINING SYSTEM

One Sutherland Alone prepares furnish of one paper machine making Bond, Book and Specialties.

SUTHERLAND
REFINER CORPORATION

TRENTON, NEW JERSEY

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger, Editor

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Commodore Hotel, New York, February 19-22, 1945.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

EMPIRE STATE SECTION. Technical Association of the Pulp and Paper Industry—Second Thursday of each month at the Woodruff Hotel, Watertown, N. Y.

CHICAGO PROFESSIONAL PAPER GROUP—Third Monday of each month except July and August at Chicago Bar Association, Chicago, Ill.

PAPER PRODUCTION

Paper production has been maintained at a high level during the current year despite numerous difficulties. The high essential rating of paper for maintaining the most efficient contribution for victory on both the military and home fronts is now obvious to almost every one. The extraordinarily heavy demands of the all-over requirements of the government cannot be met without restricting the paper supply for civilians. The Department of Commerce in its latest report points out that a progressive and increasing shortage in paper supplies for civilian uses is in evidence for the next month or two, with indications of a more acute situation before the end of the first 1945 quarter, even though the European war should end before April, 1945.

Paper production, all grades, totaled 14,390,000 tons in the first ten months of 1944, compared with 14,253,000 tons in 1943, an increase of 1%. The percentage of change in major types of paper in 1944 from 1943 is as follows: Increases—shipping sack, 28%; special industrial, 24.6%; absorbent, 4.2%, and building, 1.2%. Declines—newsprint, 12.4%; groundwood, 1.5%; book, 9.9%; fine, 5.8%; wrapping, 1.8%; sanitary, .06%, and tissue, 3.3%.

Paper board production totaled 7,541,000 tons in the first ten months of 1944, compared with 7,214,000 tons in the same period in 1943, or an increase of 4.5%. The following percentage changes are reported: container output increased 5.5%; folding boxboard, 2.1% ; cardboard, 7.8%; building, 2.1%; miscellaneous, 37.3%, and tube stock, 58.7%. Production of setup boxboard declined 11.3%. The yearly production average for 1944 to date is 88.8%, compared with a yearly average for the preceding seven years of 88.4%. The highest yearly average in the last seven years was 97.4% in 1941, and the lowest was 71.5% in 1938.

In its comment on the paper supply situation the Department states that, "The prospect for any material increase in supplies of paper and paper board for civilian use during the first and second quarters of 1945 grows dimmer. There is a strong possibility that because of increased military demands due to the need for more ammunition and supplies in Europe, the stepping up of the war in the Pacific, increased Lend-Lease requirements for special types of paper, and the quantities of paper requested by the liberated areas in Europe, that the civilian supply of paper and paper board in the United States may be tighter than ever during the first half of the coming year. Canada and the United States may find it necessary to supply some pulp to liberated countries early in 1945 unless shipping from North European countries is opened or the U.S.S.R. releases some pulp from the Archangel region. This will partly offset the equivalent supplies of paper which would otherwise be necessary for such countries and will allow them to get some of their industries under way at a very low level. Nevertheless, whether it be pulp or paper, such requirements will be a subtraction from United States civilian supplies. Currently, paper mils are facing a possible drop in production because of the outlook for a much tighter wood pulp situation. Unless there is a marked improvement in wood production, the shortage will cause a further curtailment in paper production."

In commenting on the prospect of increasing output the Department report states: "The paper industry is planning for expansion of productive capacity as soon as materials for the construction of mills and machinery become available. Orders placed for paper mill machinery and mill construction, together with orders awaiting approval, indicate new business in process or contemplated for the machinery and building industries at a rate of more than $80,000,000 a year. Orders have been approved for new paper mill machinery approximating a rate of $37,000,000 a year, as indicated by the $9,250,000 in orders approved in the three months from August 15, 1944. In addition, the paper mill machinery industry has about $4,000,000 in orders pending. More than $20,000,000 in authorizations for mill construction have been made, with about $12,000,000 more awaiting approval. There are probably $5,000,000 more in orders for new equipment costing less than $2,500, which are approved in WPB field offices, and repairs and replacements are estimated at more than $2,000,000."

Newsprint paper supply, the report goes on to say, is likely to become tighter during the next few months because of the requirements of the liberated areas. "So far, no substantial commitments have been made to them, but a program must be worked out in the near future. Swedish newsprint will not be available until spring in any substantial volume, even though VE-Day comes before then. Thus, an early capitulation of the Nazi authorities will not materially affect the newsprint situation in the United States." In

reference to groundwood printing and book papers the report states in part: "The paper supply situation in the book publishing industry has become critical particularly in the textbook field. . . . A task committee predicted a more serious shortage in 1945 unless prompt steps are taken to avert it. . . . The shortage of paper for magazine and commercial printing consumption is similarly acute. Requirements for magazines for military distribution during the last three months of the year will exceed the preceding quarter. No relief in paper supplies for this branch of the publishing industry is expected before the middle of 1945."

Reporting on fine paper the Department states: "The situation in fine papers is tight and appears likely to continue so for some time. Military requirements continue to absorb much of the production in this field. Consumption of map paper has been enormous during the European campaign and will continue high until the surrender of the German forces." Referring to the situation in wrapping, bag, and converting papers the report states: "There was no improvement in the civilian supply of wrapping paper during October. Possible increased shortages of pulp due to the seasonal decline in receipts of pulpwood, plus the critical wood inventory position, might cause a curtailment in production of wrapping and bag papers. Production of wrapping paper in October amounted to 171,000 tons, slightly more than 6% above the monthly average of 161,000 tons for the first ten months of 1944. Production of shipping sack paper during October continued at the scheduled 33,000 tons per month and there was no change in the over-all situation."

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1944		Corresponding Weeks—1943	
November 11	92.3	November 13	**89.6**
November 18	91.7	November 20	**91.4**
November 25	88.2	November 27	**87.6**
December 2	92.2	December 4	**92.2**
December 9	93.6	December 11	**88.9**
December 16	*89.2*	December 18	**89.9**

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1943	87.2	88.9	89.5	88.7	91.4	84.8	84.3	91.0	88.3	89.6	89.6	82.0	87.8
1944	88.7	88.5	88.1	87.6	88.7	89.8	80.3	90.6	88.2	92.5	*91.9*		

COMPARATIVE YEARLY SUMMARIES

	1937	1938	1939	1940	1941	1942	1943	1944
Year to Date..	81.1	71.7	83.4	80.0	97.6	91.3	88.5	*88.8*
Year Average..	79.8	71.5	83.4	85.6	97.4	90.4	87.8	

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1938	56	63	63	60	60	59	59	69	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	83	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	94	94	93	87	93
1944	90	96	95	96	96	96	85	96	92	95	*95*		

Week ending Nov. 11, 1944—96
Week ending Nov. 18, 1944—96
Week ending Nov. 25, 1944—91
Week ending Dec. 2, 1944—94
Week ending Dec. 9, 1944—95
Week ending Dec. 16, 1944—*94*

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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Recent Work at The Institute of Paper Chemistry on Dielectric Properties of Paper

By J. A. Van den Akker[1]

Abstract

Three investigations have been conducted at The Institute of Paper Chemistry on the dielectric properties of paper and a summary is here presented.

An apparatus was developed to measure the dielectric constant and power factor; the test condenser and variations in technique are described and some of the observations are given. The study also included the factors influencing the breakdown potential gradient in unimpregnated paper.

A theory of dielectric strength is included which is based on the hypothesis that cellulose fibers have an electrical barrier action.

Although the total production of electrical papers is small as compared with the tonnage of better known classes of paper, the importance of electrical papers to our whole economy is very great. Condenser tissue is necessary to the successful operation and maintenance of systems for the distribution of electrical energy; electrical capacitors are used also in innumerable devices such as radio transmitters and receivers, telephonic equipment, fluorescent lamps, etc. In metropolitan and industrial areas electric power is distributed through underground high-voltage cables insulated with oil and cable paper. The coils in transformers are separated by means of electrical pressboard. Coil winding paper, electrolytic capacitor paper, and saturating papers are used extensively in the electrical industry.

Extremely dry paper is among the best organic insulators. Its application as an insulating material is as old as the electrical industry itself. In spite of its limitations, impregnated paper has proved itself to be the most superior material for the insulation of high voltage cables, and without it the distribution of electric power would be considerably more costly than at present. No other good insulating medium is sufficiently abundant to sustain, as condenser paper does, the large production of capacitors for low frequency alternating current and direct current uses.

In addition to passing certain physical and chemical tests, condenser tissue and cable paper must meet specifications on electrical properties. Chief among these are specific inductive capacity (dielectric constant), dielectric strength, power factor (or loss factor, or loss angle), and conducting particles, the number of which must be less than a specified number per unit area.

None of the above factors is a constant but all depend upon the past history of the sample, temperature, frequency of alternation of the applied voltage and, particularly at higher voltages, also on the voltage gradient in the medium. Considerable importance is generally attached to power factor (or loss angle).

No attempt will be made here to review the rather extensive literature on dielectric studies and phenomena. Among the best reviews are those prepared annually by the Committee on Chemistry, Conference on Electrical Insulation of the National Research Council. Methods of testing power factor, dielectric constant, and other electrical properties are published by the American Society for Testing Materials. A good review of the subject, including adequate coverage of the literature, has been published by Race, Hemphill, and Endicott *(2)*.

The electrical industry has carried out most of the research and development work which, in cooperation with pulp and paper mills, has been responsible for the improvements effected in the electrical properties of condenser tissue and cable paper. In initiating the theses *(1)* which are briefly discussed in this article, it was believed that significant contributions could be made by men trained in the fundamentals of both electricity and the pulp and paper industry.

Up to the present time the dielectric properties of paper have been the subject of three doctoral investigations at The Institute of Paper Chemistry. Two of these, of which the first was initiated in 1941, were concerned with the dielectric constant and power factor of paper. The third was a study of some of the factors influencing the dielectric strength of paper. Apart from the fundamental aspects of these studies, the ultimate objective has been the improvement of papers made for the electrical industry. In connection with this aim, it has been hoped that the projected studies will serve to provide scientific information enabling the manufacturers of pulp and paper to bring their products up to specification when the consumer rejects the products on the basis of his tests.

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Dielectric Loss

The first two investigations have been chiefly concerned with dielectric loss in paper, since power factor is directly related to loss of energy and to heating in an alternating current capacitor, and is generally considered a good measure of the electrical quality of a dielectric material.

Apparatus

The apparatus for the measurement of dielectric constant and power factor consists of a thoroughly shielded conjugate Schering bridge *(3)*, a source of alternating current of frequency variable from commercial frequencies to about 10,000 cycles per second (the a.c. source is the newly developed "transitron" oscillator *(4)*), a three-stage amplifier for accurate detection of the null-balance point, and a test condenser and chamber.

In commercial operations utilizing paper dielectric, the paper is thoroughly dried, because very small amounts of moisture have a relatively large effect on the power factor. (Power factor and dielectric constant are so critically influenced by moisture that the phenomena have been employed in apparatus for the automatic indication and control of the moisture content of paper.) Because of the strong dependence of electrical properties on moisture content, fundamental studies of dielectric properties should be carried out on thoroughly desiccated paper. To accomplish this, the test condenser is arranged in a chamber which may be evacuated to a pressure of the order of 1 or 2 millionths of atmospheric pressure. The condenser may be heated to desiccate the specimen more completely, and to make it possible to observe the dependence of the dielectric properties on temperature.

There are two rather interesting features of the test condenser. The electrode having a guard ring is the lower electrode, and this is rigidly mounted on insulating posts. The upper electrode may be moved up or down during evacuation by means of a sylphon bellows, which is controlled through simple manipulation of stopcocks. The upper electrode is maintained in the raised position during evacuation, so that moisture leaving the specimen may have free access to the chamber, and thence to the pump. When a measurement is to be made, the electrode is lowered onto the specimen. The separation between the electrodes is accurately measured with the help of a spirit level vial, one end of which rests upon a post, while the other end rests upon the center of the top surface of the upper electrode. The whole chamber system may be rotated about a horizontal axis lying directly below the post. This rotation is effected by a calibrated screw, which is adjusted to bring the bubble in the spirit level vial to a predetermined point. After the specimen has been removed, three very small spacers are placed between the electrodes, and the separation is obtained by measuring the capacitance of the air condenser thus formed. A simple calculation involving this separation and the change in reading of the calibrated screw gives the separation which obtained when the specimen was in place. The sensitivity of this method is estimated to be of the order of 0.00004 inch.

After working out various techniques, not the least of which was the making of suitably uniform test sheets, a number of interesting observations was made. A few of these will be briefly mentioned here.

Special flushing experiments with purified, carefully dried nitrogen showed that flushing caused only an inappreciably faster approach to equilibrium than that observed with no flushing, the finally observed power factors being the same. Very minute leaks in the vacuum system produced a flushing of effectiveness about the same as that provided by the special flushing system. (The limiting power factor of a commercial, specially washed kraft pulp used in the manufacture of electrical papers was—after correction for difference between electrode spacing and average thickness—of the order of 0.0018.)

Incidentally, corrections of the observed dielectric constant and power factor require knowledge of the relationship between sheet density and dielectric constant. In this work, as in previous researches at the Institute on wall boards of a given kind *(5)*, it was found that the Clausius-Mosotti function was followed by paper. This function is a rather simple one stating that $(K-1)/(K+2)$ is proportional to the density, where K is the true dielectric constant of the sheet.

A hysteresis was observed in the relationship between power factor and temperature. On varying the temperature through complete cycles in the approximate range from 25° to 70° C., it was observed that the power factor rose when the temperature was reduced, and fell when the temperature was increased, the curve for ascending temperature lying appreciably above the curve for descending temperature. It was assumed that this was due to the presence of water vapor at a partial pressure as low as 10^{-5} mm. of mercury. This was borne out by special experiments designed to vary the amount of the residual moisture in the chamber. It appears that the very small power factor observed under drastic conditions of desiccation may be due in large measure to the very energetically bound last traces of moisture adsorbed by the cellulose and other constituents of the pulp.

Experimental kraft pulps varying widely in degree of digestion were used in studies of the effects of washing and lignin content. The washing of the pulp following blowing of the experimental digesters was that normally employed in the preparation of pulp for ordinary purposes. Subsequently, special washing techniques were used, and in all cases the test sheets were prepared with distilled water under conditions designed to eliminate contamination. For the latter purpose, a special glass sheet mold was constructed, and beating of the pulp was done in a Lampén mill.

Special washing experiments based on the investigations of McLean *(6)* were carried out. McLean has shown that most of the inorganic material in a pulp may be removed by acid washing, and that the removal of metallic ions is an exchange phenomenon in which the hydrogen ion replaces the cation. Subsequently, the hydrogen ion can be replaced by the cation of a given salt by immersing the pulp in a solution of that salt, thereby controlling the kind of adsorbed cation; or the acid-extracted pulp may be thoroughly washed in distilled water, resulting in a pulp having very low ash content.

A series of experiments involving this exchange phenomenon was carried out, and it was found that the metallic ion content had a very appreciable influence on the loss factor of the pulp, particularly at high frequencies.

In studying test sheets made from pulps differing in lignin content over a range from essentially zero lignin content (bleached kraft pulp) to about 6.8% lignin, it was observed that the presence of lignin is associated with an increase of the loss factor, the effect being greatest at high frequencies. It should

be pointed out in passing that pulps bleached with chlorine are not employed for electrical purposes because of the harmful effects of even small concentrations of the chlorine ion.

Dielectric Strength

The investigation of dielectric strength was carried out to explore the factors influencing the breakdown potential gradient in unimpregnated paper. For some time certain manufacturers of cable paper and other papers used for high voltage insulation have attempted to control the dielectric strength of their product by measuring the sparking or breakdown potential of the paper as it comes from the paper machine. The paper is conditioned at, let us say, 50% R.H., although in the process of incorporating the paper in high voltage cable it is rather thoroughly desiccated and permeated with carefully dried oil. In view of the fact that the paper is tested under conditions entirely different from those of the end use, it is not surprising that good correlation is not obtained in the comparison of mill tests and ultimate performance of the electrical system in which the paper serves as an insulator. Moreover, it has been indicated that knowledge of the mechanism of electrical breakdown in paper would assist the manufacturer of insulating paper when the latter fails to meet specifications on dielectric strength.

In the thesis work on this problem, it was considered desirable to measure the electrical breakdown gradient of test sheets after evacuation and desiccation in atmosphere of dry nitrogen at various pressures and temperatures. To this end a heavy-walled steel chamber was constructed. This test chamber was so designed that ten specimens could be conditioned and tested at a time. It was sufficiently rugged and well sealed to permit evacuation to a few microns pressure and subsequent entry of dry nitrogen to a pressure of at least 200 p.s.i., at temperatures up to about 60°C. Ten lead-ins insulated for high voltage and connected to the individual electrodes enable separate testing of the individual specimens.

In view of the porous nature of cable paper and similar insulating papers, it was expected that the dielectric strength of the gas in the pores between the fibers would be an important factor in the overall dielectric strength of the paper sheet. As is well known, there is a definite and known relationship between the dielectric strength of a gas and the pressure of the gas. In consequence, the most characteristic relationship observed was a steeply ascending curve relating dieletric strength of the paper (test sheets prepared from laboratory unbleached kraft pulp) and pressure of the nitrogen gas.

We cannot consider here the many interesting technical relationships and observations made in the thesis work. It is of interest to point out that some of these relationships are somewhat surprising; e. g., when maintaining sheet thickness, gas pressure and other variables at constant values, an increase in sheet density caused an appreciable decrease in dielectric strength (in the density range, 0.56 to 0.83 g./cc.). This and all other effects are accounted for by a theory developed in the thesis.

The basis of the theory is that the cellulosic fibers have an electrical barrier action. When electrical discharge in the gas is incipient, ions collected by the fibers set up a space charge field in opposition to the externally applied field, and this space charge field suppresses the discharge in the gas until the charges of opposite sign situated on the two sides of the fibers build up a field intensity inside the fibers which, in reinforcement of the externally applied field, becomes sufficient to cause electrical failure in the fibers. The barrier action then collapses, and a general discharge through the sheet takes place. It is of interest to note that the computed barrier action of the fibers in a dense sheet is substantially the same as that in a low density sheet, although the dielectric strengths of the two sheets differ appreciably, as previously described.

According to the theory, the most important individual sheet factor contributing to the dielectric strength of the paper is the dielectric strength of individual fibers. A study of the pulp properties affecting the dielectric strength of the fibers will be made in future investigations. It seems reasonable to suppose, in the meantime, that the barrier action would be dependent on the conductivity and loss factor of the fibers. In a special experiment in which the sheet was conditioned in an atmosphere of nitrogen at 50% R.H., it was found that the barrier action of fiber having appreciable moisture content was significantly but not greatly less than that of the dry fiber. In the first two thesis investigations summarized in this review, it was shown that the loss factor of dry unbleached kraft fiber is an increasing function of salt content. It may then be expected that the dielectric strength will depend upon the ash content of the pulp. However, any such effect may not be significant from a practical standpoint in view of the low ash content of insulating papers. Although changes in ash content produce significant changes in loss factor, it must be remembered that loss factor is an especially sensitive property. The loss factor and conductivity are enormously greater in paper conditioned at 50% R.H. than in thoroughly desiccated paper; yet, according to the present work, the dielectric strength of paper conditioned at 50% was of the order of 15% less than that of similar paper after thorough desiccation.

In concluding this summary of work at the Institute on dielectric properties of paper, the reader is informed of the early appearance elsewhere of two detailed articles based on the three theses.

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Issues Pictorial History of Paper

An attractive presentment of the interesting story of paper has just been published under the title of "A Pictorial History of Paper," by the Bulkley, Dunton Pulp Company, New York.

The book possesses the unique feature of representing significant developments and phases of papermaking in pictures accompanied by brief explanatory text. The bold, black illustrations of Robert Greco are very effective.

Because of the short paper supply only a small number of books has been printed. A larger edition is contemplated when conditions permit.

Viscosity and Molecular Weight

III—The Heterogeneity Coefficient

By S. Coppick[1]

Abstract

Wood pulps are known to be very heterogeneous as regards both the species and chain length of the component polysaccharides. This nonuniformity leads to divergence from both the theoretical and empirical relationships between viscosity, concentration, and infinite dilution functions which appear to be valid for more uniform preparations.

This adds further complications to viscometric methods for the determination of the average molecular weight of commercial wood pulp cellulose.

The divergence is followed during sulphate pulping. The results indicate that the distribution of chain length changes during pulping in such a manner as to give viscosity relationships similar to those obtained for blends of a number of pulps. These results confirm the "equalizing" effect of pulping which has been reported by others.

Since most commercial pulps may be considered as blends of various proportions of raw and well cooked fibers, these factors are always present and cannot be neglected in the interpretation of viscosity data.

The results indicate that the relationship between viscosity, concentration, and molecular weight must contain a "heterogeneity coefficient." This quantity is worked out for various degrees of sulphate pulping, and the data indicates that its value is unity solely for well blended, thoroughly cooked or purified pulps. However, with raw cooks the "heterogeneity coefficient" increases to such an extent as to make viscosity interpretations very inaccurate if the heterogeneity effect is neglected.

Viscosity Functions

Knowledge of the relationship between the viscosity of solutions of long chain molecules and their molecular weight has advanced considerably beyond the purely empirical stage as originally developed by Staudinger *(29, 30, 31, 32, 33)*. The labors of Huggins *(15, 16, 17)*, Kuhn *(23)*, Flory *(13)*, and Simha *(27)* have resulted in theoretical relationships which agree quite closely with the experimental data. Furthermore, recent experimental techniques for the evaluation of viscosity constants via the classical methods of physical chemistry have raised the precision of the viscometric method. These latter advances are due to Kemp and Peters *(21)*, Mark *(24)*, Flory *(13)*, etc.

Efforts to develop a practical expression for viscosity data to evaluate "infinite dilution" functions both rapidly and precisely, have led to a more thorough investigation of the variation of viscosity with concentration. The earlier equations developed by Baker *(3)*, Fikentscher *(11, 12)*, de Jong *(9)*, Arrhenious *(1)*, Farrow and Neale *(10)*, Schulz *(28)*, Papkon *(26)*, Takei *(34)*, Hess *(14)*, Bredée *(4)*, and Kauppi *(20)*, appear to be inadequate in very accurately representing the experimental data.

In previously described work *(5)*, it was shown that, in the case of the nitrate of wood carbohydrate, the expressions of Farrow and Neale *(10)*, and Fikentscher *(11)* are sufficiently accurate for calculating approximate "infinite dilution" values of the intrinsic viscosity. Over a degree of polymerization range of 2000 to 5000, a maximum error in precision of 5% occurs in a D.P. determination providing viscosities are measured below 0.3% concentration. The expression found most applicable was:

$$\frac{ln\ \eta_r}{C} = \frac{\left[\frac{ln\ \eta_r}{C}\right]_{c \to 0}^{limit}}{1 + k\,C} \qquad (1)$$

where: k = a constant equal to 0.5
η_r = relative viscosity
C = concentration in grams per 100 ml.

this simplies to:

$$[\eta] = \frac{ln\ \eta_r}{C} + k\ ln\ \eta_r \qquad (2)$$

where: $[\eta]$ is the limiting value of $ln\ \eta_r/C$ as C approaches zero, i.e., the intrinsic viscosity

$$[\eta] \equiv \left[\frac{ln\ \eta_r}{C}\right]_{c \to 0}^{limit} \equiv \left[\frac{\eta_{sp}}{C}\right]_{c \to 0}^{limit} \qquad (3)$$

From Kraemer's *(22)*

$$D.P. = K\ [\eta] \qquad (4)$$

it follows that:

$$D.P. = K\frac{ln\ \eta_r}{C} + K'\ ln\ \eta_r \qquad (5)$$

where: D.P. = the degree of polymerization
K = Kraemer's Constant = 270
$K' = k\,K$: 135

The empirical equation:

$$\frac{ln\ \eta_r}{C} = [\eta] - k\ ln\ \eta_r \qquad (6)$$

is very similar to that used by others: i.e., Schulz *(28)*

$$\frac{\eta_{sp}}{C} = [\eta] + k\ [\eta]\ \eta_{sp} \qquad (7)$$

and Martin *(25)*

$$\log\left(\frac{\eta_{sp}}{C}\right) = \log\ [\eta] + k[\eta]C \qquad (8)$$

where η_{sp} = the specific viscosity as $(\eta_r - 1)$.

These relationships differ in their range of application; equations 6 and 8 apparently are valid for the nitrates over the range studied, i.e., 0.05 to 0.3 gram per 100 ml., while equation 7 holds for lesser concentrations with a maximum limit of approximately 0.10 to 0.15 gram per 100 ml.

However, equation 7 has a much more fundamental significance, in that it has a sound theoretical background.

Viscosity and Chain Length

For randomly kinked long chain molecules Huggins *(15, 17)* has attacked the problem by consider-

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ing the molecules to be constructed as in a string of beads, where each bead represents the "grundmolecule" or building unit of the polymer. If the chain is composed of N beads, each with a radius r and having their centers a distance L apart. the generalization as applied by Huggins *(15, 17)* is:

$$\frac{\eta_{sp}}{C} = k\, B_1^2\, r\, N \qquad (9)$$

where k is a constant for the system under consideration and B is a function of the flexibility of the chain or the valence angle between units. These considerations hold, however, only for infinitely dilute solutions so that the true state of affairs is represented by the limiting expression:

$$\left[\lim_{c \to 0} \frac{\eta_{sp}}{C}\right] \equiv [\eta] = K'\, N \qquad (10)$$

This function agrees with the empirical relationship as originally proposed by Staudinger, but gives consideration only to infinitely dilute solutions.

Real Solutions

For practical utility in dealing with real solutions of appreciable concentration, an expression is required which will relate the intrinsic viscosity $[\eta]$ with directly measurable viscosities and concentrations. Bv such means it has been ardently hoped that one viscosity measurement, at a convenient concentration on a material such as cellulose, would suffice to determine the intrinsic viscosity accurately which in turn would give the molecular weight.

Many empirical expressions exist which approximate the experimental data for the variation of the viscosity with concentration, but most of these have little if any fundamental theoretical background. The empirical expression of Schulz and Blaschke *(28)* comes closest to the ideal:

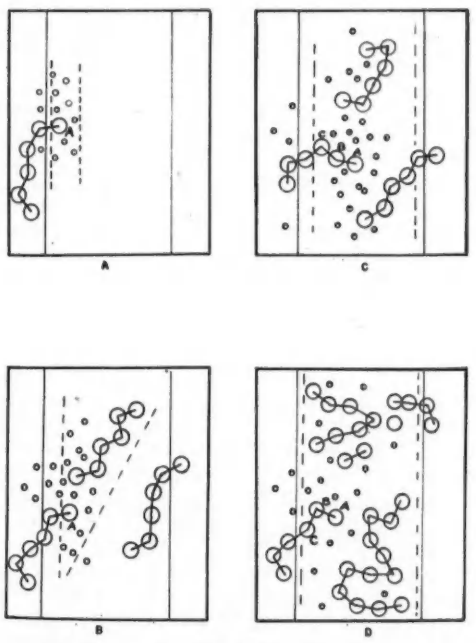

FIG. 1

Schematic Representation of Conditions Existing in Capillary Viscometry. Consideration of Various Spheres of Influence as Depicted in A, B, C, and D

$$\frac{\eta_{sp}}{C} = [\eta]\,(1 + K'\,\eta_{sp}) \qquad (11)$$

These writers *(28)*, claim that the equation holds not only for fractionated homogeneous samples of polymethylemethacrylate but also for the heterogeneous unfractionated material. Furthermore Huggins *(15, 17)* has derived this expression from fundamental considerations regarding the frictional interference of "bead-string" molecules in real solutions.

The Ideal Case for an Isolated Chain

In Fig. 1A is shown schematically the conditions existing in a capillary viscosity measurement, where for convenience the velocity gradient across the capillary is neglected. The transverse section of the capil lary illustrates a stagnant nonflow region at the glass surface, with an annular free flow space where the fluid has a velocity represented by u. A chain molecule is considered as existing for the most part in the stagnant layer, with one of its spherical units projecting into the free flow section.

The liquid streaming past sphere A gives rise to an additional frictional force superimposed upon that which arises for solvent molecules streaming past their own kind. This results in the relative increase in viscosity which we define as the specific viscositv due to dissolved particles: $\eta_{sp} = \eta_s - \eta_o/\eta_o$ where η_s is the viscosity of the solution and η_o is the viscositv of the pure solvent.

The streaming of a fluid past a stationary sphere is analogous to the phenomena of a sphere falling freely through a viscous liquid. Under such conditions the sphere reaches an equilibrium velocity defined by Stokes Law:

$$w = \frac{2\,\alpha\, r^2\,(d_1 - d_2)}{9\,\eta_o} \qquad (12)$$

where α = the gravitational acceleration
$d_1 - d_2$ = the density difference
r and η_o are the radius and viscosity as above.

The general case of a fluid moving relative to a sphere is given by: $F_{(a)} = m\,\alpha$ where m is the relative mass, expressed as $m = 4/3\,\pi\, r^3\,(d_1 - d_2)$ and F is the force exerted on the sphere, so that substituting in Equation 12 we have

$$F = 6\,\pi\, r\, w\, \eta_o \qquad (13)$$

This is the relation which both Kuhn *(9)* and Huggins *(15, 17)* have used in their original derivations, and by which they have summed up all the forces over the large number of spheres in the "bead-string" molecule to arrive at

$$[\eta] \equiv \left[\frac{\eta_{sp}}{C}\right]_{c=o} = K'\,N = K''\,M \qquad (14)$$

where M = molecular weight.

Concentration Effects

However, in these considerations, the problem has been solved for an isolated system only where pure solvent streams past the linked spheres. Huggins *(15, 17)* has modified the concept to make it applicable to real systems, where the streaming fluid is not the pure solvent, but is a polymer solution having a viscosity η_s due to the dissolved particles (Fig. 1B). Here by definition, $\eta_s = \eta_o\,(\eta_{sp} + 1)$ so that $F_s = 6\,\pi\, r\, w\, \eta_o\,(1 + \eta_{sp})$ which results in the proposed formula:

$$\frac{\eta_{sp}}{C} = \left[\frac{\eta_{sp}}{C}\right]_{c=o} (1 + \eta_{sp}) \qquad (15)$$

Molecular Interaction

Although this relationship takes into account the influence of one chain molecule on the frictional forces impending on the units of the other molecules, it does not include the influence of the liquid streaming past adjacent units in the chain. The viscosity of the liquid streaming past a given sphere will not be the bulk viscosity of that fluid, but should include effects due to the particles in the immediate vicinity, i.e., the spheres adjacent to it in the chain. These effects appear in the schematic representation of Fig. (1C). Here the submolecule A is considered to have a sphere of influence extending over several of its neighbors, B.C., etc. Huggins *(15, 17)* has made further modifications to compensate for this effect, by considering the force on each sphere to be modified by a factor k^1 such that $F_a^1 = 6 \pi r w k^1 \eta_s$ which leads to:

$$\frac{\eta_{sp}}{C} = [\eta] (1 + K' \eta_{sp}) \qquad (16)$$

This latter equation apparently holds for a number of systems, and according to Huggins *(15, 17)* the value of k^1 is independent of the chain lengths in the system.

The Heterogeneity Effect

However, in the case of very heterogeneous systems such as wood-cellulose where the chain lengths vary considerably from the average, and where hemi-cellulose and cellulose exist in "two colonies," it would appear very coincidental if interaction between solute molecules was independent of this heterogeneity. One would expect interference phenomena and streaming friction to be different for two interacting molecules, one very long and one very short, than between two molecules of the same chain length.

This may be represented as in Fig. 1D where the fluid streaming past unit A is considered to be composed of both long and short chains. The force acting on sphere A will be $F_a^1 = 6 \pi r w k^1 f(g_p) \eta_s$ where $f(g_p)$ is some function of the heterogeneity of the system. Application of this via the Huggins *(15)* method gives the following:

$$\frac{\eta_{sp}}{C} = [\eta] (1 + K' g \eta_{sp}) \qquad (17)$$

which is suggested as a more applicable relationship to cases such as wood-cellulose. Here g is a value of $f(g_p)$ for a given sample, and may be defined as the "heterogeneity coefficient." These considerations are in line with the recent findings of Mark *(24)*, who has shown that in the case of fractionated cellulose acetate for the η_{sp}/C versus C plot, variation in both the slope and intercept results when one uses solvents of poorer dispersing power. It would appear then that the viscosity-concentration relationship depends upon the specific interaction between solvent and soluble, which is in turn dependent upon the strength of the solvent. It may then be considered that a given solvent may be a good disperser for short chains while it may be a poorer solvent for longer molecules. Thus the mean specific interaction for a heterogeneous material will be a function not only of the solute and solvent, but also of the distribution of molecular sizes in the solute. Curves similar to those obtained by Mark *(24)* are demonstrated in nitrates by curves 2 and 6B of Fig. 6.

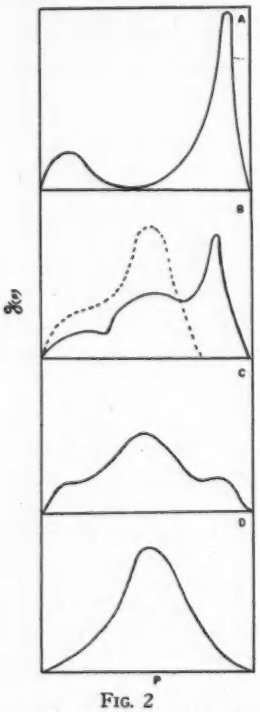

FIG. 2

Frequency Distribution Curves for the Polymolecularity of Various Cellulosic Materials

The Heterogeneity of Wood-Cellulose

To test out these considerations it was necessary to be able to vary the distribution in cellulosic materials. Cellulose nitrate appeared to be the most adequate for this purpose. For the preparation of materials with odd distributions, advantage was taken of the phenomena observed by Atchison *(2)*. By fractionation of holocellulose, Atchison determined that the carbohydrate existed in two colonies. The average D.P. represented a very heterogeneous material which consisted of portions of very low and very high molecular weight, with only a small percentage having intermediate values.

On pulping wood, it was found *(2)* that the very short chain material decreased to a great extent, while the long chain portion was degraded. This results in an increase in the medium molecular length portion. The net result is an "equalization" of the distribution. That is, the distribution curve for the component chains approaches the normal as cooking proceeds. Atchison *(2)* reports that this equalization occurs to a greater extent in sulphate than in sulphite or soda cooking.

Distributions of the "two colony" variety similar to those of Atchison have been reported *(6)* also for rayons prepared from wood pulp as well as the original bleached sulphite pulp from which these rayons were prepared. Little or no "two-colony" effects were observed for bleached cotton linters or for the rayons prepared from these.

The distribution curves *(2)* for holocellulose (A) and sulphate pulps (B) are given in Fig. 2. It is obvious that these distributions may be varied at will by the blending of types (A) and (B) to give various degrees of equalization such as represented in (C). By judicious blending of several types it should be possible to approach a normal type of distribution such as illustrated in (D) Fig. 2.

Experimental

Holocellulose nitrate, that is the nitrate of wood carbohydrate, was isolated by direct nitration of woody tissues, and subsequent removal of the nitrated and oxidized lignin. Procedures for the isolation and purification of the carbohydrate in wood as its nitrate derivative have been given in earlier communications *(5, 7, 8, 18)*.

The woody tissues, in the form of groundwood pulp, were delignified to various degrees by sulphate pulping wherein the cooking time was varied from 1 to 5 hours *(19)*. The resulting pulps were nitrated and the cellulose nitrate component isolated and purified *(8)*.

The cellulose nitrates were dissolved at various concentrations in a mixed solvent composed of alcohol, benzene, and acetone in the ratio of 1:2:7.5 by volume, and the viscosities of these solutions determined in an Ostwald tube (Wills 60 to 80 seconds) at 70 ± 0.02° F.

Blends of the various nitrates were prepared also by mixing proportions of the individual nitrates. The viscosities of these blends were determined as above. The results are given in Table I.

Agreement with Theoretical

Some of the results were plotted in Fig. 3 in an effort to confirm the equations of Schulz *(28)* and Huggins *(15)*:

$$\frac{\eta_{sp}}{C} = [\eta]\ (1 + K'\ \eta_{sp})$$

or

$$\frac{\eta_{sp}}{C} = [\eta] + K''\ \eta_{sp} \qquad (18)$$

where $K'' = K\ [\eta]$

It is apparent that over the concentration range depicted in Fig. 3, the curves vary widely from the rectilinear, and are probably better represented by:

$$\frac{\eta_{sp}}{C} = [\eta] + K''\ \eta_{sp}^{m} \qquad (19)$$

where m = a power function less than 1.

However, at lower concentrations, the theoretical equation appears to be more valid as shown in Fig. 4. For concentrations of 0.15 to 0.035 gram per 100 ml.

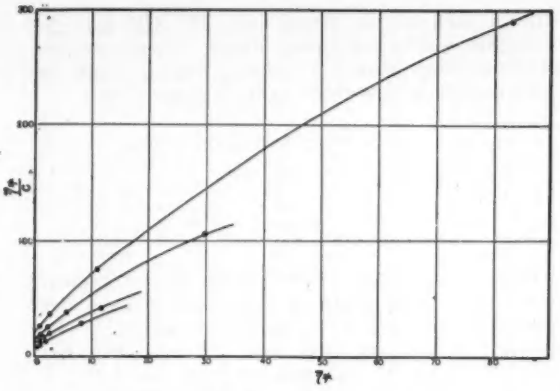

FIG. 3

Variation of the "Reduced Viscosity" with the "Specific Viscosity" for Moderately High Concentrations

the straight line relationship is realized. That is, the slopes K'' are constant and independent upon the specific viscosity, but apparently varying with

$$\left[\frac{\eta_{sp}}{C}\right]_{c \to 0}^{\text{limit}}$$

True rectilinearity is obtained at these concentrations for the lower molecular weight materials (curves 5, 3, 8B and 4 of Fig. 4). With the longer chain lengths (curves 7B, 6B and 1 of Fig. 4) the straight line relationship is approached at lower concentrations.

In Huggins' *(15, 17)* theoretical equation K'' is directly proportional to the intrinsic viscosity, $K'' = K'\ [\eta]$. The slope of the straight lines of Fig. 4 were plotted against their η_{sp}/C intercepts at zero concentration to test this relationship. In Fig. 5, the variation of the rate of change of the reduced viscosity with the specific viscosity is plotted as a function of the intrinsic viscosity, i.e.

$$\frac{d\,\frac{\eta_{sp}}{C}}{d\,\eta_{sp}} \text{ vs. } [\eta]$$

TABLE I.—VISCOSITY DATA FOR NITRATED PULPS AND BLENDS

Nitrate Number	Source	Concentration (g./100 ml.) C	Specific Viscosity η_{sp}	Reduced Viscosity $\frac{\eta_{sp}}{C}$	Heterogeneity Constant a	Heterogeneity Constant a'	Heterogeneity Coefficient g	Heterogeneity Coefficient g'
1	From raw wood	.2850	83.5	293.	.55	.22	1.09	1.21
		.1425	10.2	71.7				
		.0712	2.48	34.8				
		.0356	0.855	24.0				
2	From slightly cooked wood	.2850	29.9	105.				
		.1425	5.42	38.1				
		.0950	2.49	26.2	.50	.12	1.10	1.08
		.0475	0.92	19.4				
3	From moderately cooked wood...	.2850	14.8	52.0				
		.1425	3.40	23.8	.40	.08	1.10	1.07
		.0950	1.65	17.4				
		.0475	0.665	14.0				
4	From well cooked wood.....	.2850	8.73	30.7				
		.1425	2.27	15.9	.15	.06	1.05	1.06
		.0950	1.22	12.85				
		.0475	0.50	10.50				
5	From thoroughly cooked wood....	.2850	7.97	28.0				
		.1425	2.11	14.8	0	0	1.00	1.00
		.0712	0.79	11.1				
		.0356	0.34	9.55				
6 B	Blend: 1, 2, 3, 4, 5—high viscosity	.2850	25.6	89.9				
		.1425	4.95	34.8	0	0	1.00	1.00
		.0815	1.93	23.7				
		.0407	0.73	17.9				
7 B	Blend: 1, 2, 3, 4, 5—med. viscosity	.2850	17.8	62.5				
		.1425	**3.84**	**26.9**	0	0	1.00	1.00
		.0713	**1.30**	**18.3**				
		.0356	0.535	15.0				
8 B	Blend: 1, 2, 3, 4, 5—low viscosity.	.2850	11.55	40.5				
		.1425	2.84	19.9	0	0	1.00	1.00
		.0950	1.44	15.2				
		.0475	0.595	12.5				

Note: It should be noted that in curve 1 of Fig. 4, data is insufficient to define accurately the limiting slope. It is very probable that for Material 1 the slope increases slightly as the concentration decreases so that the values of a_1 and g_1 are probably low.

In the case of the blends (6B, 7B, 8B) and the thoroughly cooked wood pulp nitrate *(5)*, the straight line relationship holds. The line passes through the origin, confirming the theoretical equation so that

$$\frac{\eta_{sp}}{C} = [\eta]\ (1 + 0.325\ \eta_{sp}) \qquad (20)$$

where

$$\frac{d\ \dfrac{\eta_{sp}}{C}}{\dfrac{d\ \eta_{sp}}{d\ [\eta]}} = 0.325$$

These four nitrates which obey this theoretical equation are most probably those which have distribution curves which approach the "normal." By blending of the five individual nitrates, any two colony effects should be ironed out as shown in Fig. 2. The thoroughly cooked pulp *(5)* should have also a distribution approaching the "normal" as demonstrated by Atchison *(2)*, due to the "equalization" process which takes place during the cooking reaction.

In Fig. 5, it is seen further that pulps 4, 3, 2, and 1 stray considerably from the theoretical. In the case of the well cooked pulp *(4)* the divergence is slight. but becomes increasingly serious for the moderatelv slightly and undigested materials (3, 2, and 1). These are the types of materials which Atchison *(2)* has shown to have an odd distribution curve, with amounts of short and of long chain material without appreciable portions of intermediate chain length. One would conclude then that the divergence is due to the heterogeneity of the material.

Thus a_1, a_2, a_3, and a_4 represent this effect quantitatively. The magnitude of these quantities is in the order of the decreasing "two colony heterogeneity" as demonstrated by Atchison *(2)*: $a_1 = 0.55$, $a_2 = 0.50$, $a_3 = 0.40$, and $a_4 = 0.15$.

The whole of this series of distributions, both equalized and unequalized, may be represented in Huggins' *(15, 17)* theoretical equation where K^1 is allowed a tolerance of from 0.325 to 0.360 with an average of 0.345. Thus the equation:

$$\frac{\eta_{sp}}{C} = [\eta]\ (1 + 0.345\ \eta_{sp}) \qquad (21)$$

holds within a reasonable error, but is at best onlv approximate. The more reliable function is:

$$\frac{\eta_{sp}}{C} = [\eta]\left(1 + K'\ \eta_{sp} + a\ \frac{\eta_{sp}}{[\eta]}\right) \qquad (22)$$

where a is the "heterogeneity constant," which depends upon the distribution in a given system.

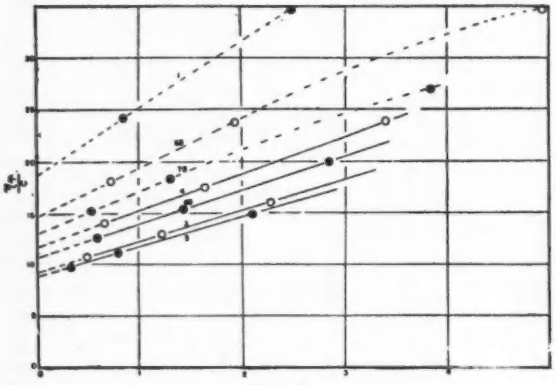

FIG. 4
Variation of the "Reduced Viscosity" with the "Specific Viscosity" for Low Concentrations

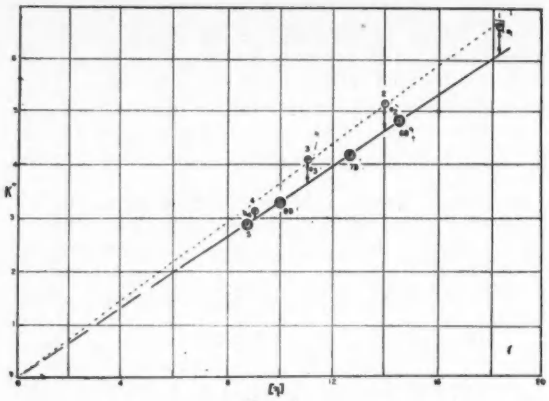

FIG. 5
The Plot of the Rate of Change of the "Reduced Viscosity" with the "Specific Viscosity," versus the "Intrinsic Viscosity"

This may be represented as:

$$\frac{\eta_{sp}}{C} = [\eta]\ (1 + K'\ g\ \eta_{sp}) \qquad (23)$$

where: $$g = 1 + \frac{a}{K'\ [\eta]}$$

and g is defined as the "heterogeneity coefficient," and K^1 is the system constant, here equal to 0.325. For well blended, equalized, thoroughly cooked or purified materials, it is indicated that this coefficient is equal to unity. Values of g for the other materials are given in Table I.

These results confirm theoretical considerations.

Conditions at Higher Concentrations

In the previous section it has been shown that the theoretical relationships hold only at very low concentrations (Compare Figs. 3 and 4). For further verification of the effects of the heterogeneity of wood cellulose on the viscosity concentration relationship, it is desirous to consider the empirical relationships which hold with good accuracy at higher concentrations. Furthermore, since even the curves 1, 6B and 7B of Fig. 4 depart somewhat from the linear even at low concentrations, the conclusions forwarded in the previous section may be criticized on the basis that the concentrations are too high for theoretical consideration.

Of all the empirical relations equating viscositv with concentration, that proposed by Staudinger *(29)* appears to be the most valid:

$$\log \frac{\eta_{sp}}{C} = \log [\eta] + K_{st}\ C \qquad (24)$$

where K_{st} is a constant which varies not only with the type of polymer, but also with its molecular weight. This expression then, as it stands, is useless for practical purposes since it contains a constant which varies from sample to sample. However, Staudinger *(29)* has related the sample constant K_{st} with the molecular weight such that

$$K_{st} = K_{stm}\ M + B \qquad (25)$$

where K_{stm} and B are constants independent of the chain length, but solely dependent upon the polymer and solvent. Thus:

$$\log \frac{\eta_{sp}}{C} = \log [\eta] + K_{stm}\ Mc + Bc \qquad (26)$$

This expression suffers from the disadvantage of containing two constants, and efforts have been made to simplify this by Martin *(25)*, who claims that in

numerous systems examined, K_{st} varied linearly with the intrinsic viscosity, and furthermore the rectilinear plot passed through the origin such that:

$$K_{st} = K\,[\eta]$$

$$\text{thus log } \frac{\eta_{sp}}{C} = \log\,[\eta] + K\,[\eta]\,C$$

$$\text{from which } \frac{\eta_{sp}}{C} = [\eta]e^{K^1\,[\eta]\,C} \qquad (27)$$

$$\text{where } k^1 = 2.3\,K$$

Martin *(25)* has compared this equation with a number of empirical relationships and gives evidence for its superior accuracy in representing the experimental data. Agreement with the equation is claimed for cellulose in cuprammonium solution for concentrations up to 5%. The constant K^1 is stated to be independent of the chain length, but to be a function solely of the polymer (cellulose, etc.), the solvent and the temperature.

Despite this, Martin's *(25)* data gives points which are quite diffuse about the straight line in the K_{st} versus $[\eta]$ plot. The divergence, especially in the cases of the lower values of $[\eta]$, appears much too great to be attributed to experimental error.

As already pointed out, it would be extremely fortuitous if such a heterogeneous material as cellulose would exhibit viscosity-concentration behavior such that the relation might be expressed accurately in an equation involving only one constant independent of this heterogeneity. This might be expected to be especially true for wood-cellulose, which has a high order of heterogeneity. It is very probable that any precise relationship should contain a $f(g_p)$ function, which is necessary even in the lower concentration and theoretical range.

One would expect on theoretical grounds that an expression of the following type would be more adequate:

$$\frac{\eta_{sp}}{C} = [\eta]e^{K'\,[\eta]\,c\,g'} \qquad (28)$$

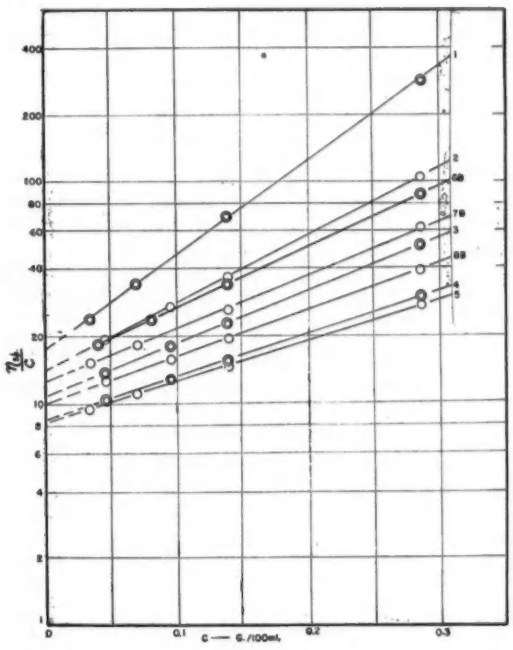

FIG. 6

The Logarithmic Variation of the "Reduced Viscosity" with Concentration

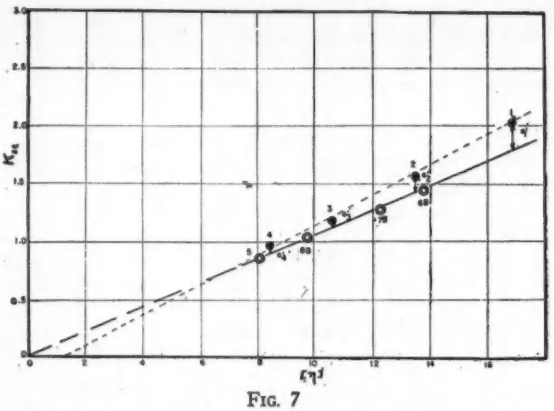

FIG. 7

Variation of Staudinger's "Steigungskonstante" with the "Intrinsic Viscosity"

where g' is as before some finite value of a heterogeneity function $f(g_p)$.

Agreement with Empirical Formulae

To evaluate these considerations the wood-cellulose nitrates of various degrees of heterogeneity were subjected to Staudinger's *(29)* and Martin's *(25)* analyses. The concentration range is up to 0.3 gram per 100 ml. of solvent and the data is that given in Table I.

The logarithmic plot of Fig. 6 validates Staudinger's equation, where the slope of the straight lines is given as:

$$K_{st} = d\,\frac{(\log \frac{\eta_{sp}}{C})}{d\,c}$$

If this slope is plotted against the η_{sp}/C intercept at zero concentration, Fig. 7 results.

Considering only those points due to unblended wood-cellulose nitrates (materials 1, 2, 3, 4 and 5) a straight line results which gives an intercept on the $[\eta]$ axis such that

$$\frac{d\left[d\,\frac{(\log\,\eta_{sp}/C)}{d\,c}\right]}{d\,[\eta]} = 0.128$$

$$\text{and } [\eta]_{K_{st}\,=\,0} = 1.3$$

$$\text{Hence } \frac{d\,(\log\,\eta_{sp}/C)}{d\,c} = 0.128\,[\eta] + 1.3 \qquad (29)$$

$$\text{and } M = k_m\,[\eta]$$

where k_m is Staudinger's molecular weight constant

$$\frac{d\,(\log\,\eta_{sp}/C)}{d\,c} \equiv K_{st} = 0.128\,k_m\,[\eta] + 1.3\,k_m \qquad (30)$$

which agrees with Staudinger's *(29)* equation:

$$K_{st} = K_{stm}\,M + b$$

However, suppose one takes into account only those materials which would be expected to have distributions approaching the "normal." There are the points 8B, 7B, 6B where "normalization" has been accomplished by blending, and point 5 where "equalization" results from a thorough cook. These points lead to a linear relationship passing through the origin where Martin's *(25)* equation would hold so that:

$$\frac{d\left[d\,\frac{(\log\,\eta_{sp}/C)}{d\,c}\right]}{d\,[\eta]} = 0.105$$

All of the points from both types of distributions may be included in an approximate linear relationship

by allowing a slope tolerance of from 0.105 to 0.117, with an average value of 0.111.

Hence this reduces to:

$$\frac{\eta_{sp}}{C} = [\eta]\, e^{k'\,[\eta]\,C} \qquad (31)$$

where k' varies from 0.241 to 0.269 depending upon the heterogeneity, which gives rise to Martin's *(25)* approximation.

If the unequalized materials (1, 2, 3 and 4) are considered to stray from the relationship given by normal materials by heterogeneity constants, a_1', a_2', a_3' and a_4', it is seen again that these vary directly in the order of the "two colony heterogeneity" which is progressively equalized by the cooking treatment *(2)*. Thus:

$$\log \frac{\eta_{sp}}{C} = \log [\eta] + .105\,[\eta]\,c + a'c \qquad (32)$$

which is equivalent to the Staudinger expanded formula *(26)* where:

$$0.105\,[\eta]c + a'c = K_{stm}\,Mc + bc$$

and from $M = k_m\,[\eta]$ it follows that:

$$a' = \frac{.105\,b}{K_{stm}\,K_m} = K\,b \qquad (33)$$

This relationship makes it apparent that both of Staudinger's equations cannot be valid with K_{stm}, k_m, and b independent of the heterogeneity. If K_m and K_{stm} are to remain constant, then b must vary with heterogeneity.

Equation 32 may be expressed as:

$$ln \frac{\eta_{sp}}{c} = ln\,[\eta] + k'g'\,[\eta]\,c$$

$$\text{where} \quad g' = 1 + \frac{2.3\,a'}{k'\,[\eta]}$$

$$\text{so that} \quad \frac{\eta_{sp}}{c} = [\eta]\, e^{0.241\,g'\,[\eta]\,c} \qquad (34)$$

This confirms the theoretical concepts. As before the heterogeneity coefficient g' is unity for material with a normal type distribution. For very heterogeneous celluloses, however, an increase as high as 20% in this coefficient has been observed. Values of a' and g' are given in Table I for the various pulps.

Conclusions

From the above it is concluded that the viscosity-concentration relationship for wood cellulose is a function of the heterogeneity of that cellulose. Hence for molecular weight determinations *via* intrinsic viscosity calculations great accuracy cannot be expected from the use of either theoretical or empirical formulae relating viscosity, concentration and infinite dilution functions.

So long as the distribution function remains unknown, there appears to be little object in attempting to determine average molecular sizes within an accuracy of $\pm$ 10% by one viscosity measurement.

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TAPPI Notes

James J. Harrison, formerly of the Ohio Boxboard Company is now research director for the Michigan Carton Company, Battle Creek, Mich.

G. A. Zinkil research chemist for the Container Corporation of America has been transferred from the Chicago to the Carthage, Ind. mill.

W. Allan Schenk, formerly with the A.P.W. Paper Company is now at the Polytechnic Institute of Brooklyn.

Charles M. Sigvardt of the Scott Paper Company has been transferred as technical director to the Marinette Paper Company, Glens Falls, N. Y.

Lloyd Lang, formerly of Kimberly-Clark Corporation is now on the staff of the Forest Products Laboratory, Madison, Wis.

A. B. Brackett has been transferred from the Frosted Foods Sales Corporation to become packaging engineer for Birds Eye, Snider Division, General Foods Corporation, 383 Madison Ave., New York, N. Y.

H. E. Duston has succeeded John J. Healy as official representative of the Monsanto Chemical Company in the Technical Association.

C. A. Frankenhoff is now president of the Dicalite Company, New York, N. Y.

R. P. Price has succeeded W. F. Bromley as official representative of the Hammermill Paper Company in TAPPI.

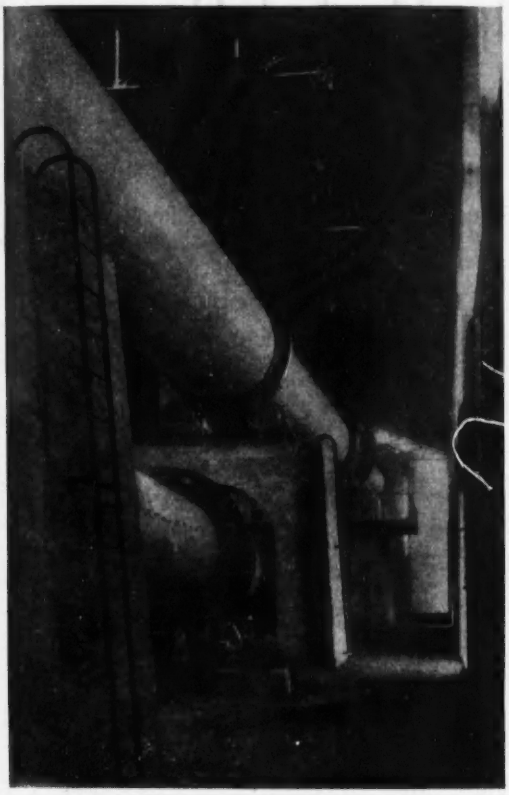
Clyde B. Morgan of the Eastern Corporation has been reelected president of the Associated Industries of Maine and T. F. Spar of the Oxford Paper Company has been elected vice president of the A.I.M.

Gosta P. Genberg, formerly with the Fraser Companies and at present with the Swedish Cellulose Company is now in the United States for a few months visit. He may be reached at the Gotham Hotel, 5th Avenue and 55th Street, New York, N. Y. or at the Cellulose Sales Company, 250 Park Avenue, New York N. Y.

F. B. Jeffords Sells Paper Interest

HINSDALE, N. H., December 26, 1944—Clarence B. Oneal has purchased of Frank W. Jeffords his one-half interest in the Robertson Company, operators of three tissue mills in Ashuelot. With the consummation of the sale Mr. Oneal becomes the sole owner of the business.

Mr. Oneal has been associated with the company since 1916 and Mr. Jeffords since 1918. In 1929 the two purchased the entire capital stock of the Robertson Company as equal partners.



PAPER MILL OPERATORS!

Are you interested in—

CONTROLLED PARTICLE SIZE AND SETTLING RATES FOR LIME, BY METHOD OF REBURNING AND SLAKING?

Write us making appointment to have a talk with our engineer.

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNA., U. S. A.

WRIGHT TRUCK

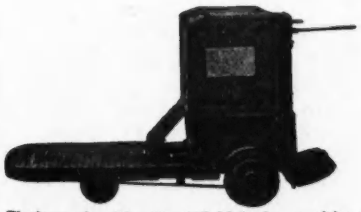
WRIGHT-HIBBARD

INDUSTRIAL ELECTRIC TRUCK CO.

INCORPORATED

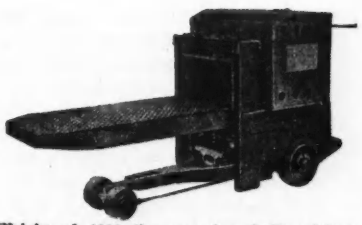
Phelps, New York

WRIGHT TRUCK



Platform size 24 x 42 x 11" high, low position; 15" high when elevated. Capacity: 2000, 3000, and 4000 pounds.

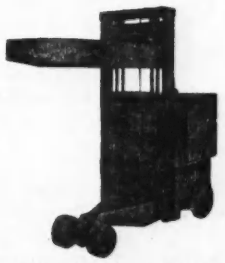
Capacity 2000 lbs. on forks 30" long. Truck turns from a 5' aisle into an intersecting aisle of 5'.



Weight of 4000 lbs. capacity—2850, without battery. Truck turns from a 5' 4" aisle into an intersecting aisle of 4'.

Platform 24" wide, 53" long and 11" high, low position. Capacity 2000, 3000 and 4000 pounds.

The Wright-Hibbard Telescoping high lift truck is designed to operate in the most congested areas of factories and warehouses. The exceptionally narrow width and short overall length found in other Wright-Hibbard trucks are retained in this model.



Platform 24" wide, 42" long and 9" high, low position. Weight of 4000 lb. capacity—2300 without battery.

New York Paper and Pulp Market Review

No Relief From Tight Paper and Pulp Supply Expected For Months—Inventories of Wood Pulp At Lowest Point Last Month—Waste Paper Collections Continue Good — New Cuttings Active.

Office of the PAPER TRADE JOURNAL,
Wednesday, December 27, 1944.

Current reports continue to indicate a continuance of the slowly deteriorating paper supply situation. Government sources reflect the expectation of a more acute situation next year. There is little hope that any substantial improvement will be realized until the second half of 1945. The prospect is, of course, the worst ever faced by the paper industry and trade. But, the country has never before engaged in so costly and extensive a war. Many manufacturers' representatives, jobbers, and general paper merchants this week report hardships and difficulties as they struggle to continue business with plenty of customers and a scarcity of goods.

The index of general business activity for the week ended December 16 declined to 143.2, from 145.4 for the preceding week, compared with 143.7 for the corresponding week last year. The index of paper board production was 153.3, compared with 158.4 for the preceding week, and with 149.0 for the corresponding week last year.

Paper production for the week ended December 16 was estimated at 89.2%, compared with 89.9% for 1943, with 87.9% for 1942, with 107.3% for 1941, and with 88.5% for the corresponding week in 1940.

Paper board production for the week ended December 16 was 94.0%, compared with 96.0% for 1943, with 85.0% for 1942, with 101.0% for 1941, and with 80.0% for the corresponding week in 1940.

A more acute paper supply situation is expected before the end of the first 1945 quarter. The Department of Commerce states that, while some improvement has occurred in the first nine months of 1944, pulp and paper output has not increased but rather has held a comparatively steady level. Large military requirements for paper and for nitrating pulp, demand for pulp and paper for the liberated areas of Europe, will remain a problem until Sweden is able to make shipments from the Baltic.

Wood Pulp

Wood pulp inventories at the end of October declined to the lowest point of the war period, a decrease of 30% under October, 1943, and approximately 62% below October, 1942. Inventories declined since the middle of 1944. Production has reached its highest point since May, 1942, and consumption has closely followed, thus permitting no additions to inventories. The new supply in October was under 1%. For the ten months of 1944, the difference between consumption, plus exports, and new supply, was less than 1%, compared with a margin of 5% in the like period in 1943.

Rags

Demand for all grades of new cotton cuttings is active. Heavy demand is reported in shirt cuttings and in the unbleached grade. Supplies are currently reported declining and a rather tight supply situation is expected. Prices are strong at ceiling levels.

Old cotton rags are moderately active in old whites, but buying in the other grades continues on a restricted basis. Prices are unchanged.

Old Rope and Bagging

Demand for Manila rope continues urgent to meet military demands. Other grades of rope are moderately active at this date. Prices are unchanged.

Demand for scrap bagging continues in restricted volume and trading in this market is slow. Prices are soft and continue to be reported nominal.

Old Waste Paper

Mill demand for waste paper continues active for all grades. The Conservation Committee of the Waste Paper Consuming Industries, reports that the increased tonnage resulting from cooperative efforts has increased the collections of waste paper substantially. To carry on the work, the committee decided to recommend an assessment of 20 cents a ton, based on the tonnage of waste paper consumed in the first six months of 1944.

The WPB states that improvements in waste paper inventories are largely due to the cooperation of the public in funneling household waste back to the mills. In November mill inventories were 249,000 tons.

Regional OPA Administrator, Daniel P. Woolley of New York, has formed a local committee consisting of prominent waste materials dealers, to promote greater compliance with price regulations.

Twine

Demand for all grades of twine is seasonally good. No important change in volume of orders or quotations has been reported to date.

I. P. Indicted on Price Charge

WASHINGTON, D. C., December 26, 1944—The International Paper Company at Fort Edward, N. Y., was indicted by a district grand jury last week on a charge of buying more than 3,400,000 pounds of waste paper at prices above O.P.A. ceilings.

Earle Weaver, described as manager of the company's purchasing department, was also named in the indictment, which said prices paid for the paper ranged from $48 to $50.99 a ton, compared with an O. P. A. maximum of $15. The Thomas Paper Stock Company, of Washington, and its president, Alvin E. Sandroff, were indicted for selling the paper.

Paper Mill Shipments Rise

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 27, 1944—October value of paper mill shipments was 178 compared with 167 in the same month of last year taking an average month of 1939 at 100 according to the industry survey of the Department of Commerce.

The value of October index of paper manufacturers inventories was 139.9 compared with 129.8 for the same month of last year.

TRADE MARK

Trinity Bag & Paper Co., Inc.

25 WEST 43rd STREET • NEW YORK 18, N. Y.

Mill Agents and Distributors

PAPER BAGS AND SACKS
All Types and Styles
Self-Opening, Square
Flat and Sacks

WRAPPING PAPERS
Kraft—Bleached and Unbleached
Butchers—Dry and Water Finish
M. G. Papers—Bleached and Unbleached

WRITINGS
Bonds and Ledgers
Index

OTHER GRADES
Envelope, Offset and Printing
Gumming—Bleached and Unbleached
Kraft Specialties of all Descriptions — both Bleached and Unbleached

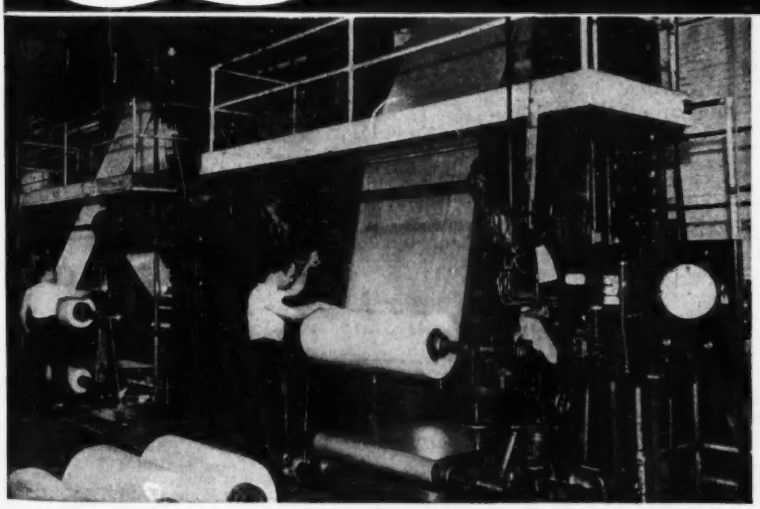
Agents for:

FLORIDA PULP & PAPER CO., PENSACOLA, FLA. • SANTA ROSA PULP & PAPER CO., PENSACOLA, FLA.

BAG PLANTS AT MOBILE, ALABAMA, AND MONROE, LA.

Speed Your Production

You Get a Better Sheet at Lower Cost With NORWOOD CALENDERS



YOU get a better sheet at lower cost with Norwood Calenders because these calenders are designed to operate efficiently at greater speeds . . . they embody definite advantages of design and construction that assure low-cost, trouble-free operation.

Check your calenders frequently. When repairs or replacements are necessary investigate the advantages of Norwood Calenders and let our engineers show you how they can be built into your present calenders. Write us about your problems now.

Get a Good Start And a Good Finish With
NORWOOD
WATER FILTERS AND PAPER FINISHING MACHINERY

The Norwood Engineering Company
17 No. Maple St., Florence Mass.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, December 27, 1944.

BLANC FIXE—The market for blanc fixe is reported steady and unchanged, for the week. Current demand is reported moderate. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton.

BLEACHING POWDER — Current demand is reported good. Supply situation reported satisfactory. Bleaching powder is currently quoted at from $2.50 to $3.10 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point.

CAUSTIC SODA—Supply situation continues tight, with production high and heavier ordnance demand. Solid caustic soda is currently quoted at $2.30 per 100 pounds. The flake and ground are currently quoted at $2.70 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CHINA CLAY—Demand for some grades of china clay is reported fair this week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE — Production reported at high rate. Demand for all uses very heavy; all essential requirements fulfilled. Prices remain unchanged. Chlorine is quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b. works.

ROSIN—Prices are quoted unchanged on most grades of rosin this week: OPA ceiling price on "G" gum rosin is set at $5.79 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $5.75 per 100 pounds in barrels, New York. Seventy per cent gum rosin is currently offered at $6.06 per 100 pounds, f.o.b. works.

SALT CAKE—Demand reported moderate. Quotations on salt cake continue to remain unchanged. Domestic salt cake is currently quoted at $16 per ton.

SODA ASH—Market requirements for soda ash continue heavy. Production at capacity. Less shortage delays reported in bagged shipments. Prices continue unchanged. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Market supply of corn reported in relatively large volume, at this date. Starch quotations continue unchanged. Pearl is currently quoted at $3.72 per 100 pounds. The powdered grade is currently quoted at $3.83 per 100 pounds. All prices f.o.b. Chicago.

SULPHATE OF ALUMINA—Supply situation is reported excellent. Quotations are unchanged. Prices on the commercial grades are quoted at from $1.15 to $1.25 per 100 pounds. The iron free is currently quoted at $1.85 per 100 pounds. All prices in car lots, in bags, f.o.b. works.

SULPHUR—Demand is reported steady for sulphur. Quotations on all grades continue unchanged. Annual contracts are currently quoted at $16 per long ton, f.o.b. mines. The current contract prices at Gulf Ports remains unchanged at $17.50 per long ton.

TALC—The market for domestic talc is reported moderately active. Quotations unchanged. Domestic grades are quoted at from $16 to $21 per ton, at mines.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—			
Roll, contract	*$58.00	@	—
Sheets	66.00	"	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*48.00	@	—
Chip	*48.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	32.20 "	37.75	33.35 "	39.25
85% Rag	.... "	....	29.90 "	35.00
75% Rag	23.00 "	27.00	24.15 "	28.25
65% Rag	.... "	....	22.80 "	27.75
50% Rag	18.70 "	22.75	19.90 "	24.25
25% Rag	16.40 "	20.00	17.55 "	21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$10.55	@ $12.75	$11.70	@ $14.25
No. 2	9.65 "	11.75	10.80 "	13.25
No. 3	9.20 "	11.25	10.35 "	12.50
No. 4	8.90 "	10.75	10.05 "	12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00 @ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	72.00
Unbl. Soda	68.00
Groundwood	50.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

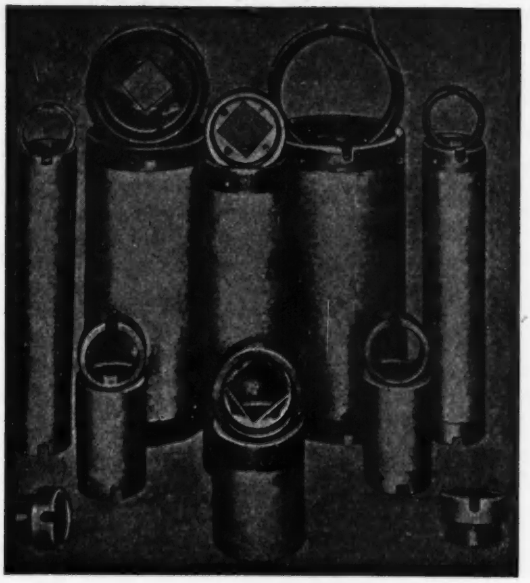
Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.



ELIXMAN

CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.
CORINTH, N. Y.

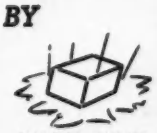
We Are Looking for Trouble

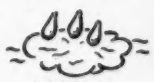
Often little things mean more work for the machine hand, the superintendent, or the purchasing agent. Does some little thing give trouble on your screens? Write us about it! Or ask to have a *UNION* representative call!

We may be able to help
and we'd sure be glad to try.

UNION SCREEN PLATE COMPANY
FITCHBURG, MASS.
(ASSOCIATED WITH UNION MACHINE CO.)

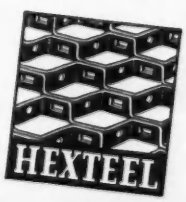
PAPER MILL FLOORS ARE CONSTANTLY *ASSAULTED BY*


IMPACT BLOWS


HUMIDITY, WETTING AND DRYING

HEAVY TRAFFIC

KLEMP
HEXTEEL
Heavy Duty Surface Armor



End your floor troubles with Klemp Hexteel. Hexteel can easily be laid over *any* old floor and filled flush with concrete or mastic. Enduring steel mesh provides solid resistant one-piece floor for lifetime service. Also use Hexteel to repair worn spots. Doubles and triples life of new floors.

Send for Complete Catalog

Includes welded and riveted steel grating, stair treads, safety mats. Write or wire.

Special Representative: C. P. Robinson, 420 Lexington Ave., New York, N. Y.

WM. F. KLEMP CO. "Steel Flooring Specialists"
6617 S. Melvina Ave. Chicago 38, Illinois

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	●	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 1 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	●	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope			
Foreign		"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Mixed Books	1.10	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Mixed Ledger, colored	2.00	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.95	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	1.10	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	●	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.30	"	—
Unpolished—			
Box	17½	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill.)

Shirt Cuttings—	
New White No. 1	.07¾
New White No. 2	.05¾
Light Silesias	.05¾
Black Silesias, soft	.03¾
New Unbleached	.07½
Washable Prints	.04¾
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable shredding	.01¾
Fancy Percales	.04¾
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04¼
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
Miscellaneous No. 1	1.20	"	—
Miscellaneous No. 3	2.65	"	—
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
No. 1 Clean bright—			
Sisal Strings			.04
No. 2 Clean bright—			
Sisal Strings			.03
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.90
Wool Tares heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings			
Misc.	2.15	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Ledger, colored	2.00	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.40	"	—
Overissue News	1.00	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled	2.87½	●	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	—	●	2.50
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	—	"	1.55
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Car Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	—	"	2.75
South American	—	"	3.00
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25		
Aust. Wool Pouches	—	"	3.00
New Zealand Wool Pouches	—	"	3.50
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Roofing Bagging	1.35	"	—

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	●	.04¾
Fancy Percales	.04¼	"	.05
New White No 1.	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¾
Underwear Cutters, Bleached	.06¼	"	.06½
Underwear Cutters, Unbleached	.05¼	"	.06
Silesias No. 1	.06	"	.06½
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06½
B V. D. Cuttings	.06¼	"	.06½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	●	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	1.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.30	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
White Blank News	1.65		
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75		
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—

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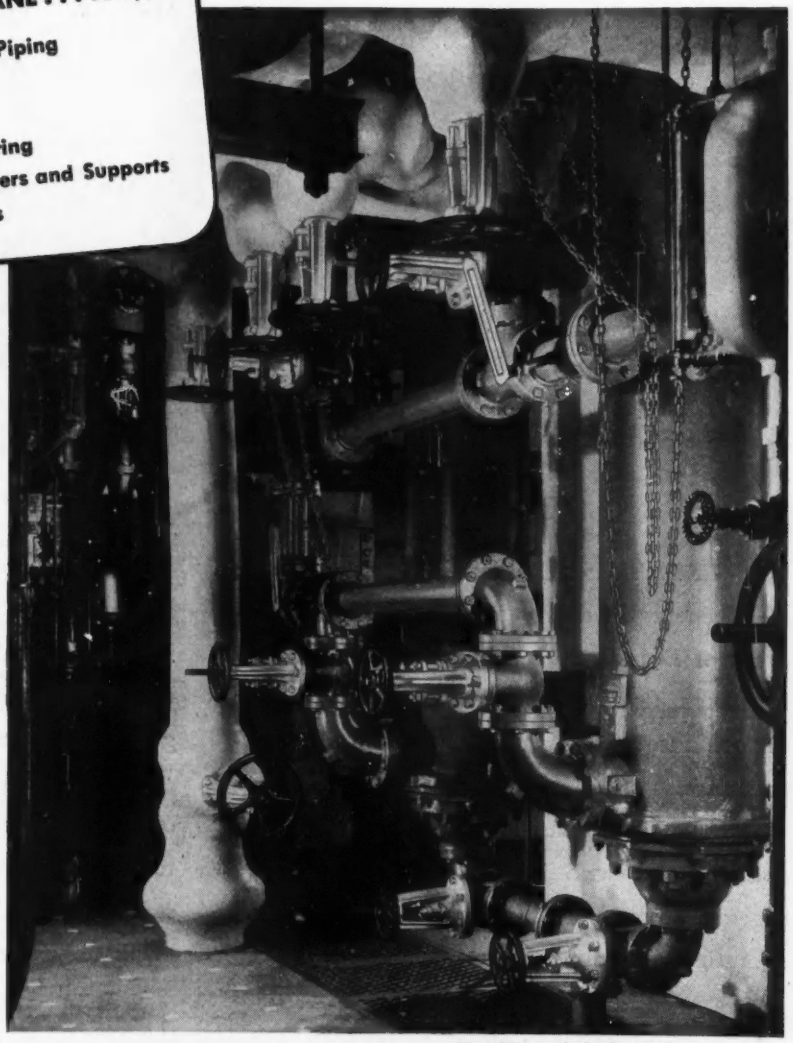

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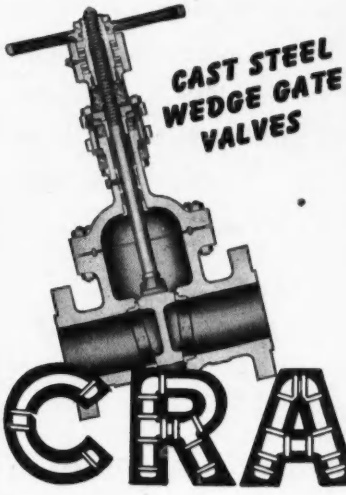

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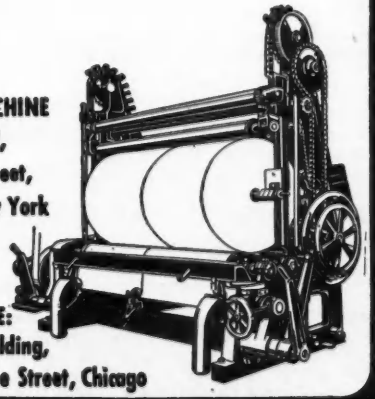

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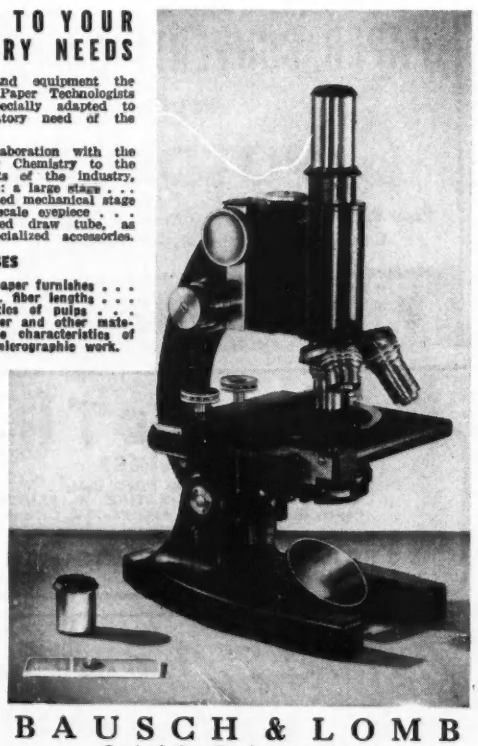

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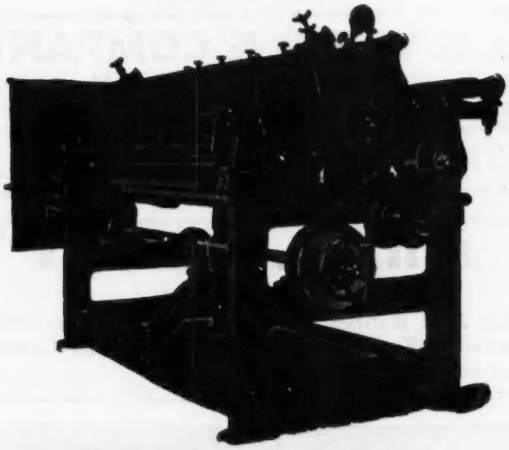

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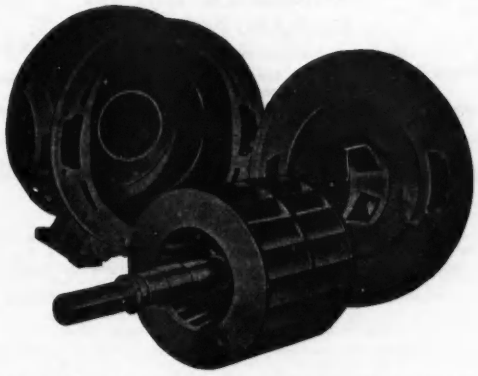

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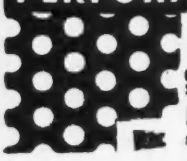
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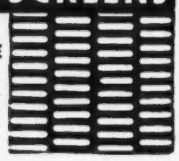
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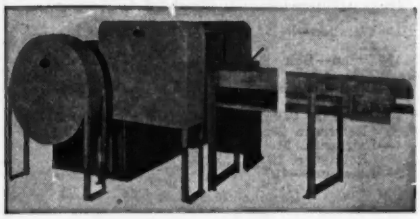

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For the Paper Manufacturer
Produced By
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KOHLER UNWIND AND REWIND REELS
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INCREASE PRODUCTION DECREASE WASTE
Maintain a constant uniform quality of product.
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BUILDERS OF SANDY HILL, BERTRAMS AND KAMYR EQUIPMENT
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Have you tried LOOMFIBRE
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FINE WHITE FIBROUS INERT FILLER
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STARCHES
SPECIAL GRADES FOR BEATER, CALENDER AND TUB SIZING

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THE CORROSION RESISTANT ALLOY
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Address replies to advertisements appearing under Box numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York, N. Y.

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Ref. No.

37. 1—Allen—4"—350 g.p.m. — 40' head — motor base—no motor.
39. 1—Twinvolute — 3" — 300 g.p.m. — 40' head—motor base—no motor.
65. 1—Lawrence Machine Co. — 4" — 430 g.p.m. — 23' head — motor base—no motor.
91. 1—Penn Pump Co. — 150 g.p.m. — 25' head—motor base—no motor.
128. 1—Worthington—220 g.p.m.—60' head.
129. 1—Foster-Wheeler Corp.—375 g.p.m.—65' head.
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137. 1—Taber Pump Co.—160 g.p.m.—30' head.
140. 1—DeLaval—200 g.p.m.—25' head.
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143. 1—Warren Steam Pump Co.—300 g.p.m. —40' head.
156. 1—Dayton-Dowd Co.—200 g.p.m.—50' head.
160. 1—Deming—160 g.p.m.—30' head.
168. 1—Worthington—330 g.p.m.—70' head.
172. 1—Goulds—600 g.p.m.—50' head.
177. 1—DeLaval—850 g.p.m.—370' head.
178. 1—DeLaval—1500 g.p.m.—100' head.
182. 1—Earle Gear & Machine Co. — 140 g.p.m.—40' head.
184. 1—Novo Engine Company—125 g.p.m. —30' head.
186. 1—Fairbanks Morse — 500 g.p.m. — 25' head.
189. 1—Worthington—4500 g.p.m.—33' head.
190. 1—DeLaval—5555 g.p.m.—170' head.
201. 1—Fairbanks Morse — 900 g.p.m. — 76' head.
202. 1—Goulds—150 g.p.m.—190' head.
205. 1—Rumsey—300 g.p.m.—60' head.
206. 1—Goulds—200 g.p.m.—150' head.
207. 1—Frederick Iron & Steel—200 g.p.m. —80' head.
208. 1—Allis Chalmers—250 g.p.m.—45' head.
213. 1—Goulds—800 g.p.m.—69' head.
216. 1—Allis Chalmers—130 g.p.m.—50' head.
217. 1—DeLaval—2200 g.p.m.—150' head.
218. 1—Worthington—250 g.p.m.—75' head.
228. 1—Buffalo 5500 g.p.m.—50' head—direct connected to 100 h.p. motor.

DUPLEX PLUNGER STOCK PUMP

2—8 x 18 Duplex Stock Pumps.

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1—Lawrence—1½" (Reference 115).
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1—Lawrence—Belt Driven—4 x 5 (Reference 219).
1—Wendler—Belt Driven—4 x 5 (Reference 221).
1—Union—Belt Driven — 6 x 8 (Reference 222).
1—Black-Clawson—Belt Driven—6 x 8 (Reference 223).
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1—Fairbanks Morse—Belt Driven — 5 x 5 (Reference 227).
2—Lawrence—10".

Various other sizes

TRIPLEX PLUNGER STOCK PUMPS

1—Moore & White 8 x 10 Triplex Stock Pump.
1—Knowles (Worthington) 10 x 10 Triplex Stock Pump.
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DUPLEX STEAM PUMP

1—Knowles (Worthington) 7½ x 4½ x 10.

Complete details regarding any of the above pumps furnished on request.
Write us regarding your particular requirements for Pumps if not listed above.

J. J. ROSS CO., 250 Frelinghuysen Avenue, Newark 5, New Jersey

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HELP WANTED

HELP WANTED

PAPER MILL NEAR CHICAGO

NEEDS

Machine Tenders
Back Tenders
Beater Engineer
} **FOR BOARD MILL**

PERMANENT POST WAR OPPORTUNITY
EXCEPTIONAL HIGH WAGES
AND
PROFIT SHARING ARRANGEMENT

Address Box 44-782 care Paper Trade Journal. **TF**

SALESMAN—TECHNICIAN WANTED

Position open in post war program of established company to call on paper and textile mills as salesman and technician, to sell and demonstrate chemical products. Prefer chemical or mechanical training—under 35 years old. Salary would depend on qualifications and experience. State full particulars as to age, nationality, education, experience and family status. Address Box 44-800 care Paper Trade Journal. J-15

CHEMIST desired for paper mill. Training in chemistry essential supplemented by experience in paper technology. Permanent position. Excellent future. Address Box 44-686 care Paper Trade Journal. TF

WANTED

ENGINEERS and DRAFTSMEN experienced in pulp and paper mill design and process by Consulting Engineers. Address Box 44-809 care Paper Trade Journal. T.F.

ONE SURE WAY

TO MEET MANPOWER SHORTAGE

B. H.—*(Before Hydrapulper)*

A large Michigan mill with two machines, each running 135 tons of filler stock daily, required one Breaker Beater; eleven 1500# beaters and thirteen men per shift to charge and dump them.

A. H.—*(After Hydrapulper)*

Same mill—same machines—same stock—same tonnages . . . but with two hydrapulpers and no beaters . . . and only three men per shift to service the hydrapulpers.

Thus a manpower saving of 77% was effected. Thus the manpower shortage was met in a most effective manner.

HYDRAPULPERS ON WASTE PAPER

This mill regularly throws in a certain number of bales of *wet strength* papers, their hydrapulpers also disintegrating this more difficult stock in stride. It takes a real pulping machine to do that thoroughly and uniformly and do it relatively fast.

With virgin stock scarce and mills being forced to use more and more scrap paper, with corresponding increases in labor and processing, mills with hydrapulpers are congratulating themselves.

Hydrapulpers in full range of capacities. Investigate now. File your order now.

THE DILTS MACHINE WORKS
FULTON, NEW YORK

SHARTLE BROS., MIDDLETOWN, OHIO
DIV. OF BLACK-CLAWSON CO., HAMILTON, OHIO

DILTS HYDRAPULPERS

HELP WANTED

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WASTE PAPER PLANT

Needs Capable Experienced Manager With Full Knowledge of Buying Selling and Grading

IN FULL CHARGE

Extremely Attractive Salary and Wonderful Proposition
Address Box 44-717 care Paper Trade Journal TF

WANTED—SALESMEN

for wax paper printed or unprinted and other kindred lines. Good territory open, good leads and a factory backed by an organization and personnel long in the field. If you are not satisfied with your present post war outlook write us in confidence. We are looking for that exceptional man who is familiar with the requirements of the baking and industrial trade and one who has had experience and aggressive sales knowledge. State age, education, experience, etc., in the first letter. Address Box 44-858 care Paper Trade Journal. J-4

WANTED

For permanent employment Los Angeles, California vicinity, 1 Tour Boss, 1 Back Tender, 1 Winderman cylinder machine or experienced paper mill mechanics for training. State age, draft status, experience, salary desired in first letter. If possible, submit snapshot (not to be returned.) This is essential war work with excellent post-war opportunities. Address Box 44-886 care Paper Trade Journal. D-28

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston, Mass.
Specializing in Paper Mill Personnel
Positions Now Open

Superintendent for Fourdrinier mill making high grade writing papers; splendid salary.
Assistant superintendent cylinder straw board mill.
Draftsmen, designers, chief engineers, master mechanics, plant engineers and assistant plant engineers.
Assistant general superintendent cylinder machine felt and paper mill.
Chemists (Several).
Tour bosses.
Machine and back tenders, beater engineers and many others.

We invite correspondence (strictly confidential) with employers seeking personnel and men seeking new positions. D-28

SALES MANAGER WANTED of proven ability for paper and pulp mill specializing in medium and light weight, high grade tissues. Must have wide acquaintance with converters. State age, past experience, salary required and other pertinent information. Address Box 44-855 care Paper Trade Journal. D-28

ENGINEERING DRAFTSMAN for Post War Design and Development Paper Mill Machinery. Experience in Paper Mill Equipment Design Helpful. Location Northern New Jersey. State experience. Certificate availability necessary. Write Box 44-527, Paper Trade Journal, 15 West 47th St., New York, 19, N. Y. TF

PAPER CHEMIST—Graduate paper chemist with some plant experience, for research, development and sales service work with well known chemical product. Location in Pennsylvania. State age, experience and salary desired. Confidential. Address Box 44-861 care Paper Trade Journal. J-11

MASTER MECHANIC for new kraft pulp and paper mill in Mexico. Excellent opportunity for qualified man. Give full particulars in first reply. Address Box 44-863 care Paper Trade Journal. D-28

SALARIED POSITIONS — This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details. R. W. BIXBY, INC., 117 Delward Bldg., Buffalo, 2, N. Y. ti

CHEMICAL OR MECHANICAL ENGINEER —Wanted for a senior position in Manufacturing Control in a large Printing and Converting plant in Niagara Falls. Should be college graduate, preferably with Paper Mill or Manufacturing Control experience. Give personal data, experience and salary desired. Apply Dr. John Campbell, Moore Research and Service Company, Inc., Niagara Falls, New York. J-4

WANTED—MILLWRIGHT for Wet Machine mill in Connecticut. Permanent position. Interesting modernization program. Address Box 44-852 care Paper Trade Journal. D-21

WANTED—Paper Mill Mechanics for maintenance and repair work. State experience, age, salary desired. San-nap-pak Mfg. Co., Inc., Rockland, Delaware. J-4

DRAFTSMAN WANTED — Large midwest board mill offers permanent position for an engineering draftsman familiar with paperboard mill equipment, design and operation. Excellent opportunity for man with proper qualifications State draft status availability and experience. Address Box 44-821 care Paper Trade Journal. J-18

FINE PAPER MILL SUPERINTENDENT, New England. Address Box 44-889 care Paper Trade Journal. D-28

WANTED — Cylinder Machine Superintendent for modern Southern Kraft Mill. Address Box 44-888 care Paper Trade Journal. J-4

WANTED—Lab. Assistant. Prefer one with some paper mill experience. Address Box 44-887 care Paper Trade Journal. J-11

MALE: PURCHASING AGENT. Age 30 to 40. Having volume Purchasing experience. Post war opportunity. Give complete history and salary desired. Address Box 44-883 care Paper Trade Journal. J-11

SITUATIONS WANTED

WANTED—Position as Production Engineer. Would consider group of mills. Excellent reputation and references. Address Box 44-831 care Paper Trade Journal. J-11

WANTED — Position as Operation Manager board mill. Full knowledge mfg. and converting. References. Address Box 44-832 care Paper Trade Journal. J-11

WANTED—Full charge of one machine board mill. Have complete requirements. What do you offer? Confidential all replies. Address Box 44-833 care Paper Trade Journal. J-11

ENGINEER—Technical graduate, design, construction and operation of Pulp and Paper Mills, wishes to make a change. Address Box 44-849 care Paper Trade Journal. D-28

SITUATIONS WANTED

CHEMIST—Now doing technical service and research work with company serving paper industry. Wishes to change affiliation to paper mill. Graduate of pulp and paper school and familiar with paper mills. Young, conscientious, with good academic and industrial record. Minimum $5000 per year. Address Box 44-862 care Paper Trade Journal. D-28

SUPERINTENDENT—Wishes position in the East. Twenty years experience all grades Tissue, including Cigarette, Facial and wet strength Napkin. Also Waxing, Manifold, Writing, Envelope, Bonds and Mimeograph. Would accept Boss Machine Tender job temporarily. Address Box 44-789 Box 44-789 care Paper Trade Journal. D-28

WANTED—Position as Plant Engineer. Twenty years practical and technical experience in Paper Mills. Replies confidential. Address Box 44-834 care Paper Trade Journal. J-11

PLANT ENGINEER—Technical education. Experienced in design, construction and operation of mill. Desires position. Address Box 44-848 care Paper Trade Journal. D-28

ASSISTANT SUPERINTENDENT — Wishes position in Southeast. Fifteen years experience all grades Kraft on Fourdrinier Machines of the largest type. Now employed. Good reason for change. Would accept machine tender job temporarily. Address Box 44-851 care Paper Trade Journal. D-28

ATTENTION SULPHATE MILL OPERATORS—Man under 40, thoroughly familiar with all phases of sulphate pulp manufacture from wood yard through bleach plant, desires connection in supervisory capacity. Employed at present as superintendent of eastern mill. Address Box 44-856 care Paper Trade Journal. J-4

PRACTICAL MANAGER, SUPERINTENDENT desires to make change. Have had 26 years experience in making Kraft, .009 Straw, Chip, Roofing and Light weight papers. Exceptional background of achievements as to production, quality and plant maintenance. A good organizer. Best of references as to ability. Married. Have family. Address Box 44-879 care Paper Trade Journal. J-18

ASSISTANT MANAGER of large paper firm desires change. Good background, executive ability. Address Box 44-867 care Paper Trade Journal. J-4

CHIEF CHEMIST of a Southern kraft paper and board mill desires position in same or allied industries. Young, aggressive and anxious to obtain a position of more responsibility with opportunity for advancement. Address Box 44-869 care Paper Trade Journal. J-4

PAPER BUYER—Background of sales and converting in the bag and envelope fields. Available January. Good mill connections. Would consider selling or representation. Address Box 44-870 care Paper Trade Journal. D-28

FOR SALE

PAPER MILL—PAPER CONVERTING —EQUIPMENT—

32" and 43" Hamblet single Knife Rotary Sheeters; 65" Clark Sheeter with automatic layboy; 110" Hamblet extra heavy mill type Sheeter; 72" six-roll double deck Back-Stand; 68" Rice-Barton Slitter & Rewinder for use in connection with paper making machine; SLITTERS: 34" Inman, 36" Langston, 42" Kidder, 48" S & S.—same as new, 62" Columbian, and 65" Moore & White. 45 x 85 Robinson Double Scorer; 44" Seybold and White Automatic Power Paper Cutters; Kidder one and two-color Rotary Web Presses.

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TF

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Guaranteed used steel pipe
and boiler tubes
Wood and steel tanks
Buildings, valves and fittings

JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yards, St. Clair Co., Ill. M-8

FOR SALE — Bag Machines, Squares, Flats, Self-opening. Practically all sizes. Address Box 44-890 care Paper Trade Journal. J-4

BLANKETS

Converted From Your Used Felts

Write for Full Details

BLOOMFIELD WOOLEN COMPANY
BLOOMFIELD, IND.

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DIE CUTTERS & CREASERS

68" COTTRELL; 65" BABCOCK; 32" x 46" THOMSON. Also Gluers, Scorers, Slitters, Sheeters, Power Cutters. Over 70 Machines Now Available for: Set-Up, Folding Box, Container and Paper Converting Plants. Send For Bulletins Or Visit Our Plant.

SOUTH WABASH ENGINEERING CO.
2929 S. Wabash Ave., Chicago, Ill.
J-11

FOR SALE

1—144" Trim Cylinder Machine

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Care Paper Trade Journal
J-11

FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24". Also Triple-Deck Frames for ninety 36" dryers, any width. The Chesapeake Paperboard Co., Baltimore, 30, Md. TF

FOR SALE—65" Hamblet single knife Sheeter, 6-roll back-stand, no layboy. Address Box 44-876 care Paper Trade Journal. J-4

PAPER COATING MACHINERY — Waxing, Oiling, Gumming, Gluing, Asphalt, Duplexing, Laboratory Coating and Treating machines. High speed. New improvement. MAYER COATING MACHINE COMPANY, INC., Rochester, N. Y. TF

FOR SALE—64" Oswego Automatic Clamp Power Cutter with power back gauge, 5 H. P. Direct Current Motor. Address Box 44-826 care Paper Trade Journal. TF

FOR SALE — 1 - Spur Gear Reducer, type OD-60-22, 75 HP, Ratio 11.54:1, practically new. Frank H. Davis Company, 175 Richdale Ave., Cambridge, 40, Mass. J-4

FOR SALE — 63" Oswego Automatic Clamp Power Cutter with power back gauge and 5 H.P. Direct Current Motor. Address Box 44-881 care Paper Trade Journal. J-4

FOR SALE—44" Seybold Cutter, guaranteed to be in good operating condition. Address Box 44-892 care Paper Trade Journal. D-28

WANTED

WANTED—Two (2) Jordans—No. 1 or No. 2 Miami or equivalent. Also, two (2) Calender Stacks approximately 100" face. Give complete description and specifications. Empire Box Corporation, Garfield, New Jersey. J-11

WANTED — DISCARDED PAPER MILL FELTS. HIGHEST PRICES paid for all kinds of discarded paper mill felts. LARGE or SMALL QUANTITIES accepted. Prices quoted immediately on receipt of samples. ADDRESS GLASER AND YOFFE, INC., 80 NORTH MAIN ST., NATICK, MASS. TF

WANTED—Brightwood Box Machine. Address Box 44-836 care Paper Trade Journal. tf

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic Presses, Sheridan Presses, Dryers. Address Box 44-835 care Paper Trade Journal. tf

FOR SALE

FOR SALE

FOR SALE

One complete 98" Fourdrinier and auxiliaries, specifications as follows:—

1—Moore & White Co. 98" Fourdrinier Paper Machine (Wire 70' Long x 98" Wide).
2—Sets of Presses.
1—18" Diameter Suction Couch Roll (Sandusky).
1—150 H.P. General Electric Co. motor and starter, driving the wet end of this machine.
26—Dryers—48" Diameter x 98" Face (2 deck).
1—Baby Dryer—30" Diameter x 96" Face.
1—Bottom Felt Dryer——36" Diameter x 96" Face.
1—Top Felt Dryer—36" Diameter x 96" Face.
1—4-Roll Calender Stack.
1—2-Bowl Reel.
1—2-Drum Moore & White Co. Slitter and Winder.
7—1000 lb. Beaters (Noble and Wood Machine Co.).
1—200 H.P. motor and starter (3 phase, 60 cycles, 440 volts), driving line shaft for these beaters.
1—Motor driven Mammoth, Jr. Jordan (Noble and Wood Machine Co.).
2—10-plate Sandy Hill Flat Screens (Packer type), Witham Fasteners.
2—Sets of spare screen plates for the above Flat Screens.
1—Ames Twin Variable Speed Engine, from 50 to 200 H.P.
1—New bottom dryer felt—72 yards long x 98" wide.
1—New top dryer felt—78 yards long x 98" wide.
7—New Wet End felts—45' long x 100" wide.
1—New Fourdrinier Wire—70' long x 98" wide (60 mesh).

In addition to the above, we have available all the line shafting, piping, spare rolls, drives, stock chests, agitators, etc.
The above described machine is in excellent condition, having been in operation approximately three years on experimental work—presently on original foundations and can be seen in actual operation. Photos on request.

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WANTED

WANTED

Four or more color Web Aniline or Wall paper Printing Press, 36 Inches or wider. State make, condition and price. Address Box 44-872 care Paper Trade Journal. J-4

WANTED

Waterbury Hydraulic Drive size 5
11—60" Diameter x 92" Face Dryers
16—48" Diameter x 92" Face Dryers
4—36" Diameter x 92" Face Dryers

with gears, frames, felt rolls and cone pulley drives. Address Box 44-708 care Paper Trade Journal. TF

WANTED

CALENDER STOCK—10" INTERMEDIATE ROLL MINIMUM
ALSO
SHEETER—SINGLE OR DOUBLE CUT-OFF BOTH FOR 72" MACHINE

Address Box 44-728 care Paper Trade Journal. TF

SHEETER WANTED

About 60", state make, serial # and how many rolls it will handle at a time.

COMMERCIAL ENVELOPE MFG. CO.
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D-28

WANTED TO PURCHASE—Paper mill in operation. Can pay all cash. Large successful mill preferred. Confidential. Address Box 44-770 care Paper Trade Journal. TF

WANTED—Used two stage Ingersoll-Rand Worthington or Chicago Pneumatic air compressor. Capacity about 1000 C. F. M. Address Box 44-865 care Paper Trade Journal. D-28

WANTED—Two used Impco #4 pulp screens. Address Box 44-866 care Paper Trade Journal. D-28

WANTED — Used 88" Murray or Carthage Chipper with 19" spout; chip crusher and screens and knife grinder. Address Box 44-864 care Paper Trade Journal. D-28

WANTED—1 - #2 Miami Jordan Plug with or without shaft; 1 - Cylinder Mould 60" diameter, 60" face; 1 - Finishing Calender 7 or 9 roll 60" to 66" face. Address Box 44-868 care Paper Trade Journal. J-11

WANTED—Any Item of Paper Tube and Paper Can Machinery, Slitters, Tube Winders, Cutters, etc. etc. We will buy such machinery in any condition. Theo. Adams, 111 W. Washington St., Chicago, 2, Ill. TF

WANTED—Several 1,000 lbs. beaters, in good condition, fly bars ½ inch or 5/8 inch thick. Keyed type rolls. Address Box 44-891 care Paper Trade Journal. J-4

WANTED—Paper Shredding Machines which shreds plain paper and waxed papers 3/32", 1/16" and 1/8" widths. Write details and price. Bleyco Paper Corp., 214 Sullivan St., New York City. D-28

WANTED—Double Drum Winder for use behind paper machine 68" to 72" wide face of drums. Address Box 44-884 care Paper Trade Journal. D-28

WANTED—45" to 48" Hamblet or other standard make Rotary Sheet Cutter. Address Box 44-885 care Paper Trade Journal. D-28

WANTED—One 86" - 90" rewinder and slitter of the sheer type for use at the end of a paper machine. Give full details, information as to condition and price. Address Box 44-882 care Paper Trade Journal. D-28

BUSINESS OPPORTUNITY

Enterprising London paper agents, having closest connections with leading paper merchants, importers and converters in Great Britain, the Colonies and the European Continent, desire to contact U. S. mills and exporters with a view to representation.

Address Box 44-815 care Paper Trade Journal. J-11

EFFICIENCY ENGINEERS—Wanted to Buy — cash — successful operating papermill, if management will remain and work with us. Efficiency Engineers, Cambridge City, 19, Indiana. D-28

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FOR 40 YEARS REDUCING STEAM COSTS IN PAPER MILLS

Stickle

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HELP WANTED

WASTE PAPER PLANT

Needs Capable Experienced Manager With Full Knowledge of Buying Selling and Grading

IN FULL CHARGE

Extremely Attractive Salary and Wonderful Proposition
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WANTED—SALESMEN

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For permanent employment Los Angeles, California vicinity, 1 Tour Boss, 1 Back Tender, 1 Winderman cylinder machine or experienced paper mill mechanics for training. State age, draft status, experience, salary desired in first letter. If possible, submit snapshot (not to be returned.) This is essential war work with excellent post-war opportunities. Address Box 44-886 care Paper Trade Journal. D-28

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston, Mass.
Specializing in Paper Mill Personnel
Positions Now Open

Superintendent for Fourdrinier mill making high grade writing papers; splendid salary.
Assistant superintendent cylinder straw board mill.
Draftsmen, designers, chief engineers, master mechanics, plant engineers and assistant plant engineers.
Assistant general superintendent cylinder machine felt and paper mill.
Chemists (Several).
Tour bosses.
Machine and back tenders, beater engineers and many others.

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SALES MANAGER WANTED of proven ability for paper and pulp mill specializing in medium and light weight, high grade tissues. Must have wide acquaintance with converters. State age, past experience, salary required and other pertinent information. Address Box 44-855 care Paper Trade Journal. D-28

ENGINEERING DRAFTSMAN for Post War Design and Development Paper Mill Machinery. Experience in Paper Mill Equipment Design Helpful. Location Northern New Jersey. State experience. Certificate availability necessary. Write Box 44-527, Paper Trade Journal, 15 West 47th St., New York. 19. N. Y. TF

PAPER CHEMIST—Graduate paper chemist with some plant experience, for research, development and sales service work with well known chemical product. Location in Pennsylvania. State age, experience and salary desired. Confidential. Address Box 44-861 care Paper Trade Journal. J-11

MASTER MECHANIC for new kraft pulp and paper mill in Mexico. Excellent opportunity for qualified man. Give full particulars in first reply. Address Box 44-863 care Paper Trade Journal. D-28

SALARIED POSITIONS — This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details. R. W. BIXBY, INC., 117 Delward Bldg., Buffalo, 2, N. Y. tf

CHEMICAL OR MECHANICAL ENGINEER —Wanted for a senior position in Manufacturing Control in a large Printing and Converting plant in Niagara Falls. Should be college graduate, preferably with Paper Mill or Manufacturing Control experience. Give personal data, experience and salary desired. Apply Dr. John Campbell, Moore Research and Service Company, Inc., Niagara Falls, New York. J-4

WANTED—MILLWRIGHT for Wet Machine mill in Connecticut. Permanent position. Interesting modernization program. Address Box 44-852 care Paper Trade Journal. D-21

WANTED—Paper Mill Mechanics for maintenance and repair work. State experience, age, salary desired. San-nap-pak Mfg. Co., Inc., Rockland, Delaware. J-4

DRAFTSMAN WANTED — Large midwest board mill offers permanent position for an engineering draftsman familiar with paperboard mill equipment, design and operation. Excellent opportunity for man with proper qualifications State draft status availability and experience. Address Box 44-821 care Paper Trade Journal. J-18

FINE PAPER MILL SUPERINTENDENT, New England. Address Box 44-889 care Paper Trade Journal. D-28

WANTED — Cylinder Machine Superintendent for modern Southern Kraft Mill. Address Box 44-888 care Paper Trade Journal. J-4

WANTED—Lab. Assistant. Prefer one with some paper mill experience. Address Box 44-887 care Paper Trade Journal. J-11

MALE: PURCHASING AGENT. Age 30 to 40. Having volume Purchasing experience. Post war opportunity. Give complete history and salary desired. Address Box 44-883 care Paper Trade Journal. J-11

SITUATIONS WANTED

WANTED—Position as Production Engineer. Would consider group of mills. Excellent reputation and references. Address Box 44-831 care Paper Trade Journal. J-11

WANTED — Position as Operation Manager board mill. Full knowledge mfg. and converting. References. Address Box 44-832 care Paper Trade Journal. J-11

WANTED—Full charge of one machine board mill. Have complete requirements. What do you offer? Confidential all replies. Address Box 44-833 care Paper Trade Journal. J-11

ENGINEER—Technical graduate, design, construction and operation of Pulp and Paper Mills, wishes to make a change. Address Box 44-849 care Paper Trade Journal. D-28

SITUATIONS WANTED

CHEMIST—Now doing technical service and research work with company serving paper industry. Wishes to change affiliation to paper mill. Graduate of pulp and paper school and familiar with paper mills. Young, conscientious, with good academic and industrial record. Minimum $5000 per year. Address Box 44-862 care Paper Trade Journal. D-28

SUPERINTENDENT—Wishes position in the East. Twenty years experience all grades Tissue, including Cigarette, Facial and wet strength Napkin. Also Waxing, Manifold, Writing, Envelope, Bonds and Mimeograph. Would accept Boss Machine Tender job temporarily. Address Box 44-789 Box 44-789 care Paper Trade Journal. D-28

WANTED—Position as Plant Engineer. Twenty years practical and technical experience in Paper Mills. Replies confidential. Address Box 44-834 care Paper Trade Journal. J-11

PLANT ENGINEER—Technical education. Experienced in design, construction and operation of mill. Desires position. Address Box 44-848 care Paper Trade Journal. D-28

ASSISTANT SUPERINTENDENT — Wishes position in Southeast. Fifteen years experience all grades Kraft on Fourdrinier Machines of the largest type. Now employed. Good reason for change. Would accept machine tender job temporarily. Address Box 44-851 care Paper Trade Journal. D-28

ATTENTION SULPHATE MILL OPERATORS—Man under 40, thoroughly familiar with all phases of sulphate pulp manufacture from wood yard through bleach plant, desires connection in supervisory capacity. Employed at present as superintendent of eastern mill. Address Box 44-856 care Paper Trade Journal. J-4

PRACTICAL MANAGER, SUPERINTENDENT desires to make change. Have had 26 years experience in making Kraft, .009 Straw, Chip, Roofing and Light weight papers. Exceptional background of achievements as to production, quality and plant maintenance. A good organizer. Best of references as to ability. Married. Have family. Address Box 44-879 care Paper Trade Journal. J-18

ASSISTANT MANAGER of large paper firm desires change. Good background, executive ability. Address Box 44-867 care Paper Trade Journal. J-4

CHIEF CHEMIST of a Southern kraft paper and board mill desires position in same or allied industries. Young, aggressive and anxious to obtain a position of more responsibility with opportunity for advancement. Address Box 44-869 care Paper Trade Journal. J-4

PAPER BUYER—Background of sales and converting in the bag and envelope fields. Available January. Good mill connections. Would consider selling or representation. Address Box 44-870 care Paper Trade Journal. D-28

FOR SALE

PAPER MILL—PAPER CONVERTING —EQUIPMENT—

38" and 43" Hamblet single Knife Rotary Sheeters; 65" Clark Sheeter with automatic layboy; 110" Hamblet extra heavy mill type Sheeter; 72" six-roll double deck Back-Stand; 68" Rice-Barton Slitter & Rewinder for use in connection with paper making machine; SLITTERS: 34" Inman, 36" Langston, 42" Kidder, 48" S & S.—same as new, 62" Columbian, and 65" Moore & White, 45 x 65 Robinson Double Scorer; 44" Seybold and White Automatic Power Paper Cutters; Kidder one and two-color Rotary Web Presses.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18, N. Y.
TF

FOR SALE

Guaranteed used steel pipe
and boiler tubes
Wood and steel tanks
Buildings, valves and fittings

JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yards, St. Clair Co., Ill. M-8

FOR SALE — Bag Machines, Squares, Flats, Self-opening. Practically all sizes. Address Box 44-890 care Paper Trade Journal. J-4

BLANKETS

Converted From Your Used Felts

Write for Full Details

BLOOMFIELD WOOLEN COMPANY
BLOOMFIELD, IND.

MACHINERY FOR SALE

DIE CUTTERS & CREASERS

68" COTTRELL; 65" BABCOCK; 32" x 46" THOMSON. Also Gluers, Scorers, Slitters, Sheeters, Power Cutters. Over 70 Machines Now Available for: Set-Up, Folding Box, Container and Paper Converting Plants. Send For Bulletins Or Visit Our Plant.

SOUTH WABASH ENGINEERING CO.
2929 S. Wabash Ave., Chicago, Ill.
J-11

FOR SALE

1—144" Trim Cylinder Machine

Address Box No. 44-877
Care Paper Trade Journal
J-11

FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24". Also Triple-Deck Frames for ninety 36" dryers, any width. The Chesapeake Paperboard Co., Baltimore, 30, Md. TF

FOR SALE—65" Hamblet single knife Sheeter, 6-roll back-stand, no layboy. Address Box 44-876 care Paper Trade Journal. J-4

PAPER COATING MACHINERY — Waxing, Oiling, Gumming, Gluing, Asphalt, Duplexing, Laboratory Coating and Treating machines. High speed. New improvement. MAYER COATING MACHINE COMPANY, INC., Rochester, N. Y. TF

FOR SALE—64" Oswego Automatic Clamp Power Cutter with power back gauge, 5 H. P. Direct Current Motor. Address Box 44-826 care Paper Trade Journal. TF

FOR SALE—1-Spur Gear Reducer, type OD-60-22, 75 HP, Ratio 11.54:1, practically new. Frank H. Davis Company, 175 Richdale Ave., Cambridge, 40, Mass. J-4

FOR SALE—63" Oswego Automatic Clamp Power Cutter with power back gauge and 5 H.P. Direct Current Motor. Address Box 44-881 care Paper Trade Journal. J-4

FOR SALE—44" Seybold Cutter, guaranteed to be in good operating condition. Address Box 44-892 care Paper Trade Journal. D-28

WANTED

WANTED—Two (2) Jordans—No. 1 or No. 2 Miami or equivalent. Also, two (2) Calender Stacks approximately 100" face. Give complete description and specifications. Empire Box Corporation, Garfield, New Jersey. J-11

WANTED — DISCARDED PAPER MILL FELTS. HIGHEST PRICES paid for all kinds of discarded paper mill felts. LARGE or SMALL QUANTITIES accepted. Prices quoted immediately on receipt of samples. ADDRESS GLASER AND YOFFE, INC., 80 NORTH MAIN ST., NATICK, MASS. TF

WANTED—Brightwood Box Machine. Address Box 44-836 care Paper Trade Journal. tf

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic Presses, Sheridan Presses, Dryers. Address Box 44-835 care Paper Trade Journal. tf

FOR SALE

FOR SALE

FOR SALE

One complete 98" Fourdrinier and auxiliaries, specifications as follows:—

1—Moore & White Co. 98" Fourdrinier Paper Machine (Wire 70' Long x 98" Wide).
2—Sets of Presses.
1—18" Diameter Suction Couch Roll (Sandusky).
1—150 H.P. General Electric Co. motor and starter, driving the wet end of this machine.
26—Dryers—48" Diameter x 98" Face (2 deck).
1—Baby Dryer—30" Diameter x 98" Face.
1—Bottom Felt Dryer—36" Diameter x 98" Face.
1—Top Felt Dryer—36" Diameter x 98" Face.
1—4-Roll Calender Stack.
1—2-Bowl Reel.
1—2-Drum Moore & White Co. Slitter and Winder.
7—1000 lb. Beaters (Noble and Wood Machine Co.).
1—200 H.P. motor and starter (3 phase, 60 cycles, 440 volts), driving line shaft for these beaters.
1—Motor driven Mammoth, Jr. Jordan (Noble and Wood Machine Co.).
2—10-plate Sandy Hill Flat Screens (Packer type), Witham Fasteners.
2—Sets of spare screen plates for the above Flat Screens.
1—Ames Twin Variable Speed Engine, from 80 to 200 H.P.
1—New bottom dryer felt—72 yards long x 98" wide.
1—New top dryer felt—78 yards long x 98" wide.
7—New Wet End felts—45' long x 100" wide.
1—New Fourdrinier Wire—70' long x 98" wide (60 mesh).

In addition to the above, we have available all the line shafting, piping, spare rolls, drives, stock chests, agitators, etc.
The above described machine is in excellent condition, having been in operation approximately three years on experimental work—presently on original foundations and can be seen in actual operation. Photos on request.

J. J. ROSS COMPANY, 250 Frelinghuysen Avenue, Newark 5, N. J. D-28

WANTED

WANTED

Four or more color Web Aniline or Wall paper Printing Press, 36 Inches or wider. State make, condition and price. Address Box 44-872 care Paper Trade Journal.
J-4

WANTED

Waterbury Hydraulic Drive size 5
11—60" Diameter x 92" Face Dryers
16—48" Diameter x 92" Face Dryers
4—36" Diameter x 92" Face Dryers

with gears, frames, felt rolls and cone pulley drives. Address Box 44-708 care Paper Trade Journal. TF

WANTED

CALENDER STOCK—10" INTERMEDIATE ROLL MINIMUM
ALSO
SHEETER—SINGLE OR DOUBLE CUT-OFF
BOTH FOR 72" MACHINE

Address Box 44-728 care Paper Trade Journal. TF

SHEETER WANTED

About 60", state make, serial # and how many rolls it will handle at a time.

COMMERCIAL ENVELOPE MFG. CO.
600 6th Avenue, New York 11, N. Y.
D-28

WANTED TO PURCHASE—Paper mill in operation. Can pay all cash. Large successful mill preferred. Confidential. Address Box 44-770 care Paper Trade Journal. TF

WANTED—Used two stage Ingersoll-Rand Worthington or Chicago Pneumatic air compressor. Capacity about 1000 C. F. M. Address Box 44-865 care Paper Trade Journal. D-28

WANTED—Two used Impco #4 pulp screens. Address Box 44-866 care Paper Trade Journal. D-28

WANTED—Used 88" Murray or Carthage Chipper with 19" spout; chip crusher and screens and knife grinder. Address Box 44-864 care Paper Trade Journal. D-28

WANTED—1-#2 Miami Jordan Plug with or without shaft; 1-Cylinder Mould 60" diameter, 60" face; 1-Finishing Calender 7 or 9 roll 60" to 66" face. Address Box 44-868 care Paper Trade Journal. J-11

WANTED—Any Item of Paper Tube and Paper Can Machinery, Slitters, Tube Winders, Cutters, etc. etc. We will buy such machinery in any condition. Theo. Adams, 111 W. Washington St., Chicago, 2, Ill. TF

WANTED—Several 1,000 lbs. beaters, in good condition, fly bars ½ inch or ⅝ inch thick. Keyed type rolls. Address Box 44-891 care Paper Trade Journal. J-4

WANTED—Paper Shredding Machines which shreds plain paper and waxed papers 3/32", 1/16" and 1/8" widths. Write details and price. Bleyco Paper Corp., 214 Sullivan St., New York City. D-28

WANTED—Double Drum Winder for use behind paper machine 68" to 72" wide face of drums. Address Box 44-884 care Paper Trade Journal. D-28

WANTED—45" to 48" Hamblet or other standard make Rotary Sheet Cutter. Address Box 44-885 care Paper Trade Journal. D-28

WANTED—One 86"-90" rewinder and slitter of the sheer type for use at the end of a paper machine. Give full details, information as to condition and price. Address Box 44-882 care Paper Trade Journal. D-28

BUSINESS OPPORTUNITY

Enterprising London paper agents, having closest connections with leading paper merchants, importers and converters in Great Britain, the Colonies and the European Continent, desire to contact U. S. mills and exporters with a view to representation.

Address Box 44-815 care Paper Trade Journal. J-11

EFFICIENCY ENGINEERS—Wanted to Buy — cash — successful operating papermill, if management will remain and work with us. Efficiency Engineers, Cambridge City, 19, Indiana. D-28

CLASSIFIED ADS BRING RESULTS

FOR 40 YEARS REDUCING STEAM COSTS IN PAPER MILLS

Stickle

STEAM SPECIALTIES COMPANY

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The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Monsanto Chemical Co.
Norton Co.

ADHESIVES
Arabol Mfg. Co.
National Adhesives Division of National Starch Products, Inc.
Philadelphia Quartz Co.
Stein, Hall & Co., Inc.
United States Rubber Co.

AGITATORS
Appleton Machine Co.
Dilts Machine Works, Inc.
Dorr Company
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Montague Machine Co.
Moore & White Co.
Noble & Wood Machine Co.
The Norwood Engineering Company
H. K. Porter Company Inc.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

BAG MACHINES
Thomas W. Hall Co., Inc.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Weber, Herman G.

BARKERS AND CHIPPERS
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Carthage Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

BARS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.
The Moore & White Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Simonds Worden White Co.
Valley Iron Works Co.

BEARINGS
Bantam Bearings Division, The Torrington Company
Black-Clawson Company
Jones, E. D. & Sons Co.
The Manhattan Rubber Mfg. Co.
Montague Machine Works
Rollway Bearing Co.
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Timken Roller Bearing Co.
Valley Iron Works Co.
T. B. Woods' Sons Company

BEATERS & JORDANS
The Appleton Machine Co.
Black-Clawson Company
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Herman Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
J. J. Ross Company
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Simonds Worden White Co.
Valley Iron Works Co.

BELTING
Allis-Chalmers Mfg. Co.
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
J. E. Rhoads & Sons
United States Rubber Co.
T. B. Wood's Sons Company
Worthington Pump & Machinery Corp.

BLEACHING APPARATUS
Improved Paper Machy. Corp.
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
Noble & Wood Machine Co.
Pennsylvania Salt Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Montague Machine Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company
Valley Iron Works Co.

BOTTOMS
Harrington & King Perforating Co.
Kalamazoo Tank & Silo Co.

CALENDERS
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
The Norwood Engineering Company
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works
Waldron Corp., John

CASTINGS
Appleton Machine Co.
Black-Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
The Frederick Iron & Steel Co.
Grinnel Company
Hamblet Machine Co.
E. D. Jones & Sons Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Smith & Winchester Mfg. Co.
Traylor Engineering & Mfg. Co.
Union Machine Company
Union Screen Plate Co.
Valley Iron Works Co.
Walworth Company

CENTRIFUGAL MACHINERY
Bird Machine Co.
De Laval Steam Turbine Co.
Nichols Engrg. & Research Corp.
Ross J. O. Eng. Co.
Shartle Brothers Machine Co.

CHEMICALS
Aktivin Corporation
Amer. Cyanamid & Chem. Corp.
Ansul Chemical Co.
Calco Chemical Co.
Diamond Alkali o.
Dispersion Process Inc.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Geigy Co., Inc.
Gottesman & Co.
Hooker Electrochemical Company
The Mathieson Alkali Works, Inc.
Monsanto Chemical Company
The Neville Company
National Oil Products Co.
Naugatuck Chemical Div. of U. S. Rubber Co.
Niagara Alkali Company
Paper Makers Chemical Department, Hercules Powder Co.
Pennsylvania Salt Mfg. Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Stauffer Chemical Company
United States Rubber Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

CLEANING MATERIALS
Amer. Cyanamid & Chem. Corp.
Bird Machine Co.
E. I. du Pont de Nemours & Co., Inc.
Oakite Products, Inc.
Paper Makers Chemical Department, Hercules Powder Co.
Magnus Chemical Co.
Nichols Engrg. & Research Corp.
Pennsylvania Salt Mfg. Co.
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Wyandotte Chemicals Corp.
J. B. Ford Division

CLUTCHES
Appleton Machine Co.
Black-Clawson Company
Hudson Sharp Machine Company
Farrel-Birmingham Co.
Fawick Airflex Co., Inc.
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Stearns Magnetic Mfg. Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

COATING MACHINERY
Hudson Sharp Machine Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G.

COMPRESSORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Ingersoll-Rand Co.
Nash Engineering Co.
Worthington Pump & Machinery Corp.

CONSULTING ENGINEERS
W. H. L. D. Betz
W. R. Cliffe
Ferguson, Hardy S.
Hardy, George F.
Johnson & Wierk, Inc.
L. I. M. E.
Merritt-Chapman & Scott Corp.
Main, Inc., Chas. T.
O,Donoghue, Roderick
J. E. Sirrine & Co.
Stone & Webster Engrg. Corp.

CONVEYORS
Black-Clawson Company
Murray, D. J. Mfg. Co.
Ross Engineering Corp., J. O.

CORES
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Sonoco Products Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Smith & Winchester Mfg. Co.
Walker-Goulard-Plehn Co.

COUPLINGS
Black-Clawson Company
De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
The Frederick Iron & Steel
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John
Westinghouse Electric Mfg. Co.
T. B. Wood's Sons Company

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Thomas W. Hall Co.
Noble & Wood Mach. Co.
Perkins & Son, Inc., B. F.
The Smith & Winchester Mfg. Co.
Taylor Stiles & Co.

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The Norwood Engineering Company
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DE-INKING
Kinsley Chemical Co.
O'Donoghue, Roderick

DIGESTERS
The Biggs Boiler Works Co.
H. K. Porter Company Inc.
Pusey & Jones Corp.

DOCTORS
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Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Black-Clawson Company
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Shartle Brothers
United States Rubber Co.
Westinghouse Electric & Manufacturing Company

DRIERS
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Murray Mfg. Co., D. J.
J. J. Ross Company
Ross, J. O. Engineering Corp.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

DRIVES
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Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Horton Manufacturing Co.
Rodney Hunt Machine Co.
W. A. Jones Fdy. & Mch. Co.
Montague Machine Co.
Moore & White Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Norwood Engrg. Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Valley Iron Works Co.
Westinghouse Electric & Manufacturing Company

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co.
Norwood Engrg. Co.
D. J. Murray Mfg. Co.

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Calco Chemical Co.
Ciba Company
E. I. du Pont de Nemours & Co.
Geigy Co., The
General Dyestuff Corp.
National Aniline Division, Allied Chemical & Dye Corp.
Paper Makers Chemical Department, Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co.

EVAPORATORS
Black-Clawson Company
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Traylor Engineering & Mfg. Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

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Merrick Scale Mfg. Co.
Leeds & Northrup
Traylor Engineering Co.
Wallace & Tiernan

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Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co. Inc.
Draper Bros. Corp.
Fitchburg Duck Mills
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Woodward, Baldwin & Co.

FELT GUIDES
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Colloid Co.
Amer. Cyanamid & Chem. Corp.
International Pulp Co.
W. H. Loomis Talc Corp.
Union Talc Co.
Vanderbilt Co., R. T.
Wishnick-Tumpeer, Inc.

FILTERS
Moore & White Co.
The Norwood Engineering Company
J. O. Ross Engrg. Corp.
Worthington Pump & Mchy. Corp.
Witco Chemical Co.

FLOORING, GRATING & TREADS
Hendrick Mfg. Co.
Klemp, W. F., Co.
Norton Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Robinson, C. P.
United States Rubber Co.

FORMING MACHINES
Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

WHERE TO BUY

GEARS
Black-Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS
Covel-Hanchett Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Simonds Worden White Co.
United States Rubber Co.

HEATING, VENTILATING AND AIR CONDITIONING
The Appleton Machine Co.
Armstrong Machine Works
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Worthington Pump & Mchy Corp.

HOISTS
Appleton Machinery Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones &Sons Co.

HOSE (Air, Water, Suction, etc.)
The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan Inc.
United States Rubber Co.

INSTRUMENTS, TESTING AND MEASURING
W. H. & L. D. Betz
N. P. Bowsher
The Foxboro Company
General Electric
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
B. F. Perkins & Son
Taylor Instrument Cos.
Wallace & Tiernan Co., Inc.
Westinghouse Electric & Manufacturing Company
Wilkens-Anderson Co.

JORDAN FILLINGS
Appleton Machine Co.
Behr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Simonds Worden White Co.
Valley Iron Works Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Valley Iron Works Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers

LUBRICANTS
Gulf Oil Corporation
Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
Tide Water Associated Oil Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Montague Machine Co.
Lobdell Car Wheel Co.
Walker-Goulard-Plehn Co.

MIXERS
Youngstown Welding & Engrg. Co.

MOISTENING EQUIPMENT
The Spray Engineering Co.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric & Manufacturing Company

PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.

PACKING
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
Black-Clawson Company
Downingtown Mfg. Co.
Thomas W. Hall Co.
Moore & White Co.
Pusey & Jones
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester

PAPER MACHINE SLICES
Black-Clawson Company
E. D. Jones & Sons Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.

PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

PIPE
The American Rolling Mill Co.
Black-Clawson Company
Crane Company
Grinnell Company
Shartle Brothers Machine Co.
Taylor Forge & Pipe Works
Walworth Company
Youngstown Welding & Engrg. Co.

PLATERS
The Norwood Engineering Company
Perkins & Son, Inc., B. F.

PLATES
The American Rolling Mill Co.
Black-Clawson Company
Hendrick Mfg. Co.
Klemp, W. F., Co.
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.

PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
The Richardson Economy Plug Co.
Shartle Brothers Machine Co.

PRESSES
Black-Clawson Company
Farrel-Birmingham Co.
Dietz Machine Wks.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
Valley Iron Works Co.
Waldron Corp., John
Weber, Homer G.

RUG MILLS
Traylor Engineering & Mfg. Co.

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Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Dorr Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Ingersoll-Rand Co.
Johnson Corp.
Lombard Governor Corp.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
Quimbey Pump Co. Div. of H. K. Porter Company, Inc.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company
Worthington Pump & Machinery Corp.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp. J. O.
Valley Iron Works Co.

RECTANGULAR BINS
Traylor Engineering & Mfg. Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
Montague Machine Co.
Moore & White Co.
The Norwood Engineering Company
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co.
E. D. Jones & Sons Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Brown Instrument Co.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric & Manufacturing Company

RESINS
American Cyanamid & Chemical Corp.
The Neville Company
The Resinous Products & Chemical Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp.
Lobdell Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Norwood Engineering Company
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
Roehlen Engraving Co.
J. J. Ross Company
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

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Youngstown Welding & Engrg. Co.

ROLL STANDS
Cameron Machine Co.
Johnstone Eng. & Machine Co.
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.

ROTARY KILNS
Traylor Engineering & Mfg. Co.

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Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman C.

SCALES
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Morey Paper Mill Supply Co.
Union Machine Co.
Union Screen Plate Co.

SCREENS
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Appleton Wire Works
Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co.
Hendrick Manufacturing Co.
E. D. Jones & Sons Co.
Montague Machine Co.
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The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.

SCRUBBERS
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Rotogravure Engrg. Co.
Valley Iron Works Co.

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Downingtown Mfg. Co.
Improved Paper Machy. Corp.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

SHREDDERS
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Carthage Machine Co.

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Black-Clawson Company
The Dow Chemical Co.
du Pont, E. I., de Nemours & Co.
National Oil Products Co.
Paper Makers Chemical Department, Hercules Powder Co.
Socony-Vacuum Co.
Philadelphia Quartz Co.

SIZING PROCESSES
National Oil Products Co.

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Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
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Hamblet Machine Co.
Hudson Sharp Machine Company
Johnstone Eng. & Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SPRAY NOZZLES
The Spray Engineering Co.

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Clinton Co.
National Starch Products, Inc.
Stein, Hall & Co., Inc.

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Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

STRAPPING & STRAPPING MACHINES
Acme Steel Co.
The Stanley Works

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Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

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E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Westinghouse Electric & Manufacturing Company.

SULPHUR
American Cyanamid & Chemical Corp.
Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company

SULPHUR BURNERS
Valley Iron Works Co.

TALC
American Cyanamid & Chemical Corp.
W. H. Loomis Talc Corp.
International Talc Company

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E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Noble & Wood Machine Co.
H. K. Porter Company Inc.
Rodney Hunt

J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
United States Rubber Co.
Waldron Corp., John
Youngstown Welding & Engrg. Co.

THICKENERS, DECKERS & SAVEALLS
Bird Machine Company
Bulkley, Dunton Pulp Co. Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
E. I. Du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.
Witco Chemical Company

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Ingersoll-Rand Co.
The Stanley Works
Walworth Company

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Elwell Parker Electric Co.
Wright-Hibbard Ind. Elec. Truck Co.

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Crane Co.
Grinnel Company
Johnson Corporation
Shartle Bros. Mch. Co.

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Rodney Hunt Machine Co.
Shartle Brothers
Valley Iron Works Co.

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De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric & Manufacturing Company
Worthington Pump & Machinery Corp.

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Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Shartle Brothers Machine Co.

VALVES
Crane Company
Dilts Machine Works
The Foxboro Company
E. D. Jones & Sons Co.
Kennedy Valve Mfg. Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
William Powell Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company

VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.

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Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Rodney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WELDING EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Company
Walworth Company
Westinghouse Electric & Manufacturing Company

WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WINDERS AND REWINDERS
Black-Clawson Company
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
Johnstone Eng. & Machine Co.
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron Corp., John

WIRES
Appleton Wire Works
Black-Clawson Company
Bulkley, Dunton Pulp Co. Inc.
Cheney Bigelow Wire Works
Hayden Wire Works
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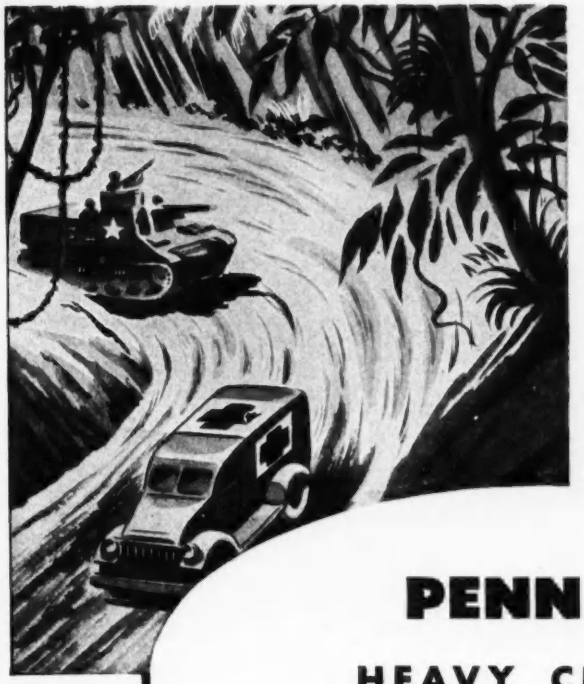

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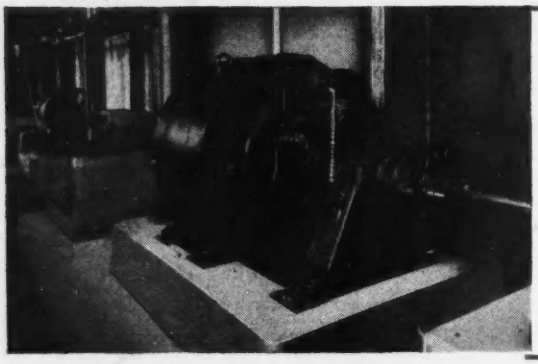

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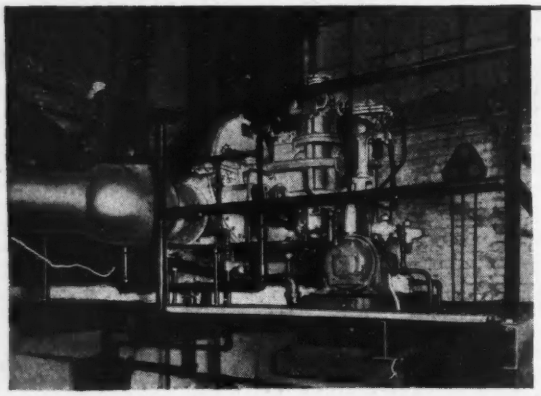

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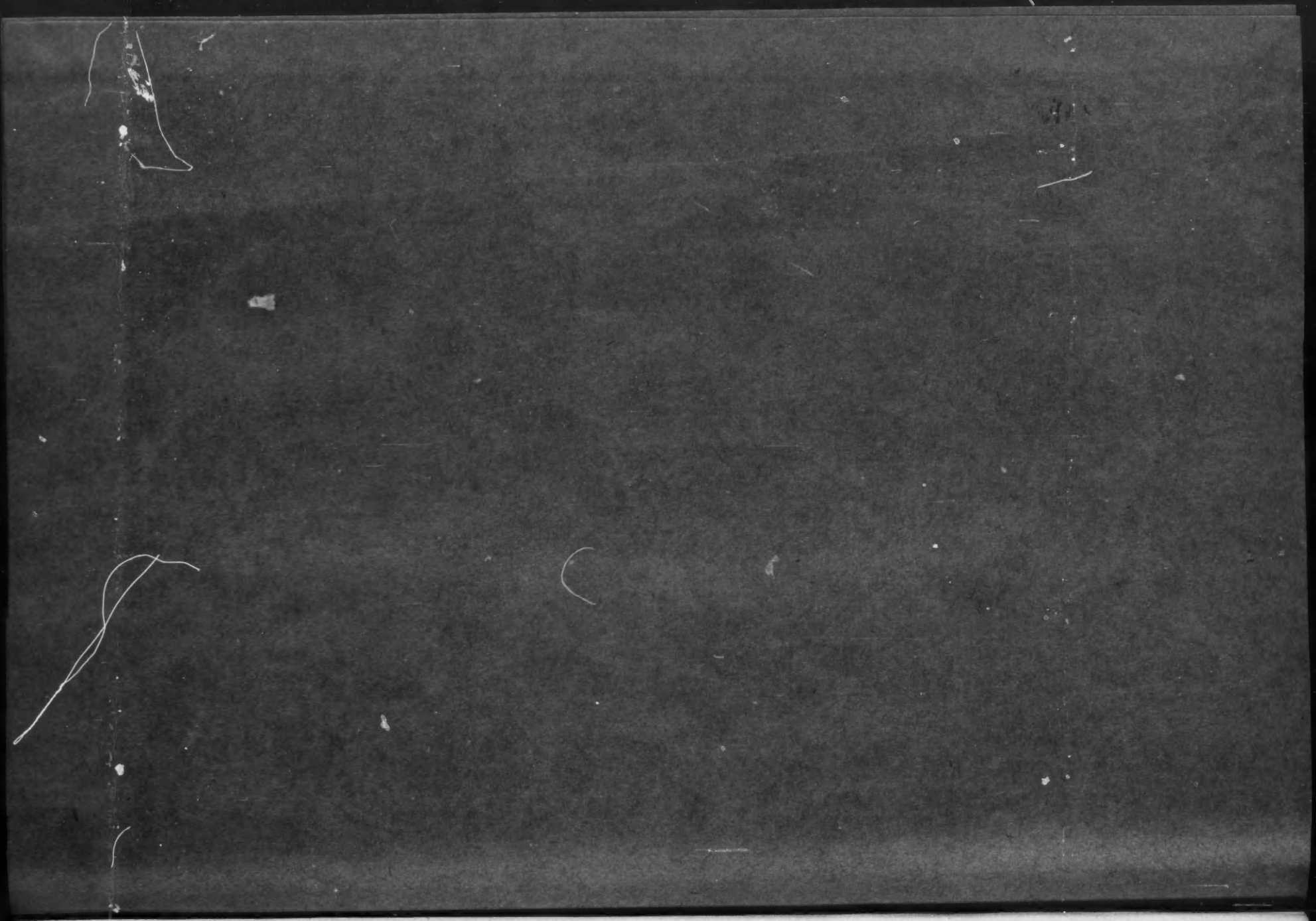
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